

MIND AND BRAIN.

THE
HUMAN MIND

IN ITS RELATIONS WITH

THE BRAIN AND NERVOUS SYSTEM

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TO

WILLIAM B. CARPENTER, ESQ., M.D., F.R.S.,
F.G.S., F.L.S.

MY DEAR DR. CARPENTER,—

Whether I have regard to your eminent position as a man of science, to your special attainments as a physiologist, or to your private worth, I know of no one to whom I can inscribe this little work with so much propriety and with such gratification to my own feelings, as to yourself.

Although, in the course of independent thought, I have been led to conclusions not altogether in unison with some of those at which you have yourself arrived, I am not the less conscious that I am indebted to you and to your writings for most of the fundamental doctrines expounded in the ensuing pages.

DEDICATION

For all these reasons, then, I beg you to accept of the dedication of this volume, with my earnest wish that science may long number you amongst its devoted followers, and physiological investigation amongst its distinguished and successful cultivators.

Believe me,

My dear Dr. Carpenter,

Ever most faithfully yours,

DANIEL NOBLE.

MANCHESTER, *March 10th*, 1858.

P R E F A C E.

THE substance of the following pages was made to form one of the earlier chapters in the Author's work on *Psychological Medicine*, the second edition of which was published about three years ago. He was prevented upon that occasion from giving that development to his views, and that expansion to his argument, which he would willingly have done, by a desire to maintain what he deemed to be an appropriate symmetry and correspondence among the separate parts of his treatise. Moreover, the Author found that many readers who took but little interest in the pathological and other practical portions of the volume, felt very differently as to all that concerned the correlation of psychology and physiology. Influenced by the considerations arising out of these circumstances, he has been

induced to give to his views a somewhat fuller exposition than they have hitherto received, and to make them the subject of a separate publication.

• He would state, in conclusion, that his aim has been rather to treat the several divisions of his subject with succinctness and lucidity, than to engage in extended, and what many would consider to be tedious discussion, as to any one of them; hoping, by this means, to interest and in some measure to instruct the amateur and the general student.

CHAPTER I,

INTRODUCTION.

THE human mind is the conscious principle in man. The investigation of its attributes, its capacities and powers, constitutes what is called Psychology; and, when the inquiry is prosecuted with reference to the functions of the brain and nerves, the result is denominated Physiological Psychology.

The existence within us which sees, hears, and touches, is unmistakeably one with that which forms ideas, and groups them for reproduction by memory; it is obviously the same entity which performs the highest intellectual operations, and which loves, fears, and hopes,—one in the midst of multiplicity, identical in diversity, and permanent in succession. It is the same simple principle which turns in upon and takes cognizance of itself, which controls its own state, which exercises WILL.

In all scientific psychology, we must accept this

INTRODUCTION.

simplicity of consciousness as a first principle. It is a postulate which in philosophical discussion of the subject should always be made the foundation-fact. It is one of those truths which is neither demonstrable, nor to be made clearer by ratiocination; it is one which is felt and admitted in obedience to the primary laws of thought.

Metaphysical inquiry, concerning itself with the manifold states of the simple consciousness, has produced numerous systems of pure psychology; one, however, that shall be strictly and thoroughly scientific, should only be attempted on the basis of physiology. And, certainly, the practical application in medicine of any doctrine of mind can only have place when the subject is thus dealt with, so intimate is the correlation of psychology and physiology.

There is probably no proposition more firmly established in the science of life, than that which affirms the brain and higher portions of the nervous system to be subservient to the mental operations; so that whenever unequivocal signs of consciousness are observed in any being, there may be inferred the presence of a brain and nervous system. Consciousness, indeed, in the

natural order, would appear to be universally manifested through the instrumentality of brain; the higher class of nerves being for the establishment of communication with the world without.

But it is obvious that physiological psychology cannot be expected to have that definitiveness which is characteristic of the more physical departments of philosophical investigation. The connexion of mind and brain can never, probably, be determined with complete scientific precision; for, whilst our researches into purely physical conditions will educe facts and circumstances that strike observers in a certain exact and uniform manner, mental phenomena can be apprehended but imperfectly. And even when these latter are sufficiently clear and distinct to admit of notation and record, their significance with different inquirers is very unequal. Thus, whilst general science, including the inferior branches of physiology, has of late years progressed with giant strides, a physiology of the brain and a philosophy of mind commanding universal acquiescence have scarcely been approached.

In order that a system of analytical psychology should be attained, standing in true scientific rela-

tion with our knowledge of the brain, we ought to be able to appreciate the varying phases of consciousness, in watching their outward manifestation, with some of that readiness and accuracy wherewith we can estimate physical conditions. Were this within our power, considerable advances might be made towards a correct and detailed psychology, duly associated with our information concerning the structures within the head. But the inevitable absence of objective standards by which to measure the value of mental facts, materially reduces their comparability among themselves and with other facts; on this account, psychical phenomena do not admit of any natural or perfect system of classification, neither do they allow themselves to be linked-on to physical facts with anything like philosophical exactitude. Yet, of course, scientific induction demands very distinct recognition of the comparable worth of all the circumstances which lead to it.

It happens, then, that most of the materials obtainable for conclusions regarding mental phenomena, consist of external manifestations which do not always suggest a sure interpretation; and thus we have to speculate concerning them,

whether occurring in man or animals, by aid of the analogies gained in self-introspection. And it is in this way that we are led to estimate the significance of many of those facts, which show that varieties exist in the several forms which consciousness assumes.

The absolute connecting link between matter and mind must always remain—as it is—inscrutable to scientific investigation; and hence, if we should attempt, even hypothetically, to trace the sequence of phenomena involving their related action, we must inevitably be arrested on attaining that final *change in molecular disposition* which immediately and causatively precedes *inchoate consciousness*; there being an inestimably wide breach between the ultimate physical condition and the primary psychical state.

And yet these difficulties, which are inherent in the subject, have not prevented inquisitive spirits, in all ages, from hazarding speculations concerning the relations of psychical phenomena to the physical organization. In a very early stage of physiological inquiry, the seat of the Soul, or Conscious Principle, was a theme of elaborate and ingenious hypothesis. Hippocrates and Hierophylus placed it in the fibres of the brain;

Democritus, in the region of the temples; Strabo, in the space between the eyebrows; Epicurus allocated it in the breast; Diogenes, in the left ventricle of the heart; the Stoics, with Chrysippus, in the whole heart; Empedocles placed it in the blood; Plato and Aristotle, with the more elevated schools of philosophy, connected the soul with the whole body; and Galen suggested that each part of the body had its particular soul.* In later times, however, conclusions have been attained with regard to the functions of the Encephalon—the structures within the head—which leave no reasonable doubt that the conscious principle has its special seat in that region; conclusions abundantly sustained by evidence from all sources.

At the foot of the animal scale, where the presence of consciousness is doubtful, but feeble traces of nerve structure, and sometimes none at all, are discoverable; a little higher, insects and the mollusca have so simple a development of the nervous system, that some physiologists have doubted their possession of its crowning constituent—a brain; but, if they have any con-

scious principle, it must certainly manifest itself through the instrumentality of nerve substance; and whatever be its form or locality, it must be regarded, because of its function, as at least a rudimentary brain. In ascending the scale, and coming to fishes, we observe a decided advance in the encephalic organization; for, whilst in the Invertebrata the brain or its analogue is hardly distinguishable from the ganglionic centres of the nerves of sense; in fishes, with which the vertebrated series commences, masses corresponding to the Cerebrum proper, or Hemispheres, and to the Cerebellum, in mammals, become apparent; and with these coincide more striking and obvious displays of consciousness. The yet higher degree of this endowment, and the more varied states in which it exhibits itself in birds, correspond with increased and more complex development of the encephalon. In the mammalia, the advance which is made in the structures within the head is remarkable; their magnitude, both absolutely and relatively to the rest of the body, greatly exceeds that which obtains in the inferior tribes; and the cerebral hemispheres begin to assume a convoluted appearance. And, indeed, throughout the whole

animal series, commencing with the very lowest creatures and ascending till we culminate in man, it is found that the loftier and the more varied the psychical manifestations, the more highly organized are the nervous masses constituting the encephalon.

But, in point of fact, we instinctively localize consciousness within the head. The popular phraseology of all nations uses the terms *head* and *brain* to express and denote the capacity of thought. Amongst ourselves it is said, in familiar converse, when we would characterize a weak-minded person, he has got no head, no brains; and, in an opposite sense, he is possessed of a strong head, or a powerful brain. The poets and dramatists of every epoch and clime, falling in with the language of daily experience, constantly speak of the mind, or conscious principle, under the designations head and brain.

CHAPTER II.

PSYCHOLOGY AND PHYSIOLOGY.

THE very fact of consciousness involves the simplicity of its principle; a consciousness that is divided in its genetic origin, cannot be conceived. More especially is the notion of unity inseparable from *self*-consciousness, wherein the mind looks inward and realizes objectively the intuition expressed by the first personal pronoun. The idea of self—the *Me*-ity—irresistibly suggests the conviction of an existence that is indivisibly one.

But yet, however simple the conscious principle is in its essence, it may vary its mode of being, and experience changes of state, according to the objects and conditions by which it is called into activity and with which it may engage itself. Thus light, shade, and figure, present, as outstanding realities, place this inward principle of consciousness in the state of *seeing*, ordinarily succeeded by the state of *knowing*; this latter may

be followed by a state of *thinking*, or of *loving*, or of *fearing*, or of some other such affection. These various modes of consciousness will sometimes, either from the fact *being* so, or from their rapid succession, appear to have simultaneous existence—a wonderful simplicity underlying the most remarkable complexity. These several forms of mental existence and activity are commonly dealt with as separate and distinct faculties of the mind; and so, in a certain sense, they are. But the terms and the phraseology in which psychological expositions and explanations are usually made, suggest but too frequently to the inexperienced student, that the Mind is a congeries of particular entities, rather than, as it is, a principle that is undivided and indivisible.

Psychological *systems* are, for the most part, made up of classifications which their authors institute, of the several psychical states; and such systems, moreover, concern themselves with the particular laws which seem to regulate their various modes of manifestation. The pure psychologist simply investigates the facts of consciousness, whilst the physiological psychologist labours to discover the organic conditions under which the different mental phenomena have place.

Philosophers of the former class have usually indicated certain prominent and striking characteristics of the mind's action, and have laboured to prove their origin in certain fundamental dispositions, tendencies, and capabilities; these have been then so arranged, and otherwise dealt with, as to make up the particular systems of abstract teaching. This proceeding of the pure psychologist will be more intelligible, if I exemplify it by a brief illustration of some of the results professedly obtained. The Sexual Instinct has very generally been regarded as a distinct and primitive disposition; Dugald Stewart, in his "Outlines," so regards it. Love of the Young and Helpless, as something apart from ordinary attachment, is recognised, as being in a like category, both by Reid and Stewart. A Desire of Society is described by Stewart very much as the Appetite for Society is set forth by Henry Home, of Kames. A like disposition is discussed as a special tendency by Dr. Thomas Brown. The existence of a primitive instinct of Sudden Resentment is taught by Reid and Stewart, and by Thomas Brown as Instant Anger. Lord Kames refers to this disposition as Courage. Brown recognises a Principle of Malevolence,

identical in some respects with the Appetite for Hunting, of Kames. This last-mentioned philosopher discusses as fundamental the Sense of Property and an Appetite for Storing-up Things of Use; whilst Brown disputes the existence of Acquisitiveness, as an independent feeling. A Disposition for Concealment, Lord Bacon minutely describes in his Essay on Cunning. Reid and Stewart treat of a Desire for Power. Brown regards Pride as an elementary disposition, defining it as "that feeling of vivid pleasure which attends the consciousness of our own excellence;" Kames discusses this sort of feeling, as a Sense of Dignity. Reid and Stewart treat of the Desire of Esteem, mentioned by Brown as the Desire of Glory; Kames calls it the Appetite for Praise. Brown ranks Melancholy among the primitive tendencies of mind; Kames so regards Fear. Reid, Stewart, and Brown adduce Benevolence. Kames treats of a Sense of Deity; the Devotional Sense, as a human characteristic, is very generally recognised, although not adverted to either by Reid, Stewart, or Brown, as a fundamental disposition. Hope, as a primitive feeling, is cited by Stewart; and, certainly, as one that "springs eternally in the human breast," it is

recognised by all the world. A sense of Grace and Taste is brought in by Lord Kames, corresponding in most respects with Brown's Original Emotion of Beauty. A sentiment of Wonder is noticed by Adam Smith; Brown treats it as a primitive disposition of the mind, and Kames mentions it with the same significance. Most metaphysicians and moral philosophers, including Cudworth, Hutcheson, Reid, Stewart, and Brown, admit a moral sense. Firmness, Perseverance, Obstinacy are regarded by many authors as fundamental dispositions.

The faculties more purely intellectual are also divided and classified in various ways. We have Perception, Conception, Memory, and Judgment. A division into the powers of Will, Memory, and Understanding, is very old. *Knowing* faculties and *reflective* faculties are often distinctively regarded. The faculty of Language is usually recognised as primitive. *Reasoning* engages itself with the relations of cause and effect, and, moreover, traces the analogies subsisting among things essentially unconnected; a twofold action of the reasoning powers which is generally acknowledged by mental philosophers, including Bacon, Malebranche, Kames, Locke, and others. The

phrenological school indicates, these two methods of exercising the reason, in describing the so-called faculties of Causality and Comparison.

The physiological psychologist, in attempting to trace the connexion which the brain and nervous system maintain with the mind and its various manifestations, avails himself largely of the fact so general in physiological anatomy, that size, or amount of nervous tissue, constitutes an element of functional energy,—a fact strikingly exemplified by the circumstance that a very small human brain, indicated by a head of decidedly inferior dimensions, is always accompanied with mental imbecility. This relation, indeed, between size of structure and vigour of function has supplied the guiding thread to most investigators who have striven, by the aid of anatomy and physiology, to elucidate or advance either the psychology of man or that of the Animal Kingdom at large. In particular, the correspondence between mental power and encephalic characteristics has, in this way, been sought for. Thus, Aristotle, Pliny, and Galen, as well as certain modern writers, have laid it down that the human species owes its mental superiority over the rest of the visible creation to the possession of an encephalon,

the magnitude of which exceeds that of other creatures ; a proposition, however, that cannot be sustained by ample evidence. Although to a cursory observer the fact may appear to be as stated, and the notion upon superficial consideration may seem plausible enough, the rule encounters numerous exceptions, and cannot, therefore, supply the basis of any natural law. The elephant and certain cetaceous animals have a larger development of the encephalon than man. Again, the dog and the monkey have smaller brains than the horse, the ox, or the ass ; and yet these latter are below the former in point of psychical acuteness and strength. Indeed, in whatever way the proposition may be tested, its fallacy will be seen upon any attempt at extended application.

Physiologists perceiving the error involved in the foregoing suggestion, and yet feeling certain that size of the encephalon had some concern with mental energy, next proposed to estimate the intelligence of creatures by noticing the proportion in bulk which the encephalon bore to the rest of the body. And here, as before, the scheme appeared to hold good so long as general results only were contemplated, whilst at the same time some of the difficulties attaching

to the former proposal seemed to be got rid of; in the case of the elephant, for example, although this quadruped does possess an encephalon that is *absolutely* larger than that of man, it is yet smaller in relation to the size of the body. But, unhappily for this view, it was soon discovered that the sparrow, the redbreast, the wren, the canary, and some species of monkeys, had the structures within the head much larger in proportion to the rest of the body than man himself.

Sommering, followed by some other physiologists, saw the insufficiency of the last-mentioned rule, and advanced another scheme. He suggested that the volume of brain, proportionate to that of the nerves and spinal cord, would furnish a measure of the intelligence of creatures; but here, again, failure ensued, when an impartial appeal to facts was made. It was observable that, although for the most part man has advantage over the lower animals in predominance of the encephalon, so considered, the fact is not universal; it was found that in this respect the monkey, the dolphin, and many birds, exceed man.

Cuvier and some others conceived that the magnitude, relative to the nerves, of the cranio-

spinal axis—encephalon and spinal cord—might furnish a guide for determining the psychological energy of species; but Cuvier himself soon discovered exceptions, and cited the dolphin as one.

Another method of determining the physical conditions of the intelligence was proposed, or at least adopted, by Richerand. It consisted in estimating the relative size of the head and face; the degree in which the former preponderated, being supposed to furnish the index of mental power. It was suggested, in illustration, that whilst man was at the top of the scale, ferocious and stupid animals, with enormous jaws and small brains, were low down; and that this fact arose from the circumstance of their whole existence being so largely concentrated in the exercise of the senses of smell and taste. But this plausible notion will not harmonize with constant experience. Not to go beyond our own species, the inadequacy of the scheme is revealed. Leo the Tenth, Montaigne, Racine, Mirabeau, and Franklin had both large heads and large faces; whilst Bossuet, Kant, and Voltaire had small faces, though large brains. And certainly there is no evidence to show that, in the first-named

personages, the facial magnitude was any detriment to their intelligence; or that, in the last-mentioned, the exalted powers of mind displayed were in any way connected with the smallness of visage.

Camper's celebrated facial angle took its origin in attempts to make out the physical conditions of psychical endowment. This angle, it is well known, is formed by drawing one line from the incisor teeth in the anterior part of the upper jaw to the *meatus auditorius*, and by prolonging another from this part to the most elevated portion of the forehead. According to Camper's theory, the more nearly the angle formed by union of the two lines approaches to a right angle, the higher will be the degree of intelligence. Lavater, admitting such a gauge of intellectual excellence, arranged an imaginary series, commencing with the Frog, and progressively ascending to the Apollo Belvidere. Camper's notion has always received considerable attention, even from anatomists and physiologists of the highest reputation; Cuvier supplied a long list of animals to exemplify its validity. But although the method prescribed by Camper may lead, in many instances, to results apparently satisfactory, it will not endure any

rigorous test. The angle itself, indeed, yields no accurate measure either of the encephalon itself or of any of its parts; and yet it was upon some admitted connexion between size of brain and psychical power that it seems to have rested its claims to consideration. A little close attention to the subject will exhibit the fallaciousness of Camper's scheme. Let us suppose the case of two individuals with a like form and magnitude of the encephalon, and, moreover, with a somewhat equal development of the intelligence; it may happen in such circumstances that one has a large projecting upper jaw, and the other a small and somewhat receding one; in this state of things, the respective facial angles will indicate a difference of ten, fifteen, or even twenty degrees. It is not difficult to meet with illustrations of such a fact. Regarding this view with reference to the lower creation, Blumenbach states that three-fourths of the animals known to man have an identical facial angle with every possible variation, so far as can be determined, in the kind and degree of psychical endowment. Further, it should be remembered that in many animals the outer table of the skull is so far removed from the internal, as in the elephant, for example, that the angle in question

can afford no possible index to the size or configuration of the encephalon.

It may be noticed that all the foregoing propositions have been advanced by their authors rather as *Rules of art* for obtaining a measure of the intelligence, than as *Principles of science* deduced from comprehensive analysis of the mind, in connexion with systematic investigation of the brain and nervous system. Of late years, however, a more scientific proceeding has taken their place, and various efforts have been made to correlate mental philosophy with anatomy and physiology. The celebrated Dr. Gall, towards the close of the last century, first distinctly enunciated the doctrine, that different parts of the encephalic mass fulfil different functions. From this doctrine was very soon developed a system of physiological psychology, identical in principle with the doctrine which teaches that particular nerves fulfil particular functions.

From the remotest periods, indeed, of physiological speculation, the brain and nervous system have been regarded as having some special connexion with conscious life. So early as the Greek civilization, there were philosophers who maintained even the distinctness of the nerves of

movement and feeling. But, although such views were obscurely entertained by the ancients, they received neither scientific form nor systematic development. It has been reserved for modern science to achieve positive results. The intuitive genius of Unzer, in the last century, anticipated in a striking manner many recent doctrines, as also the reasonings employed to corroborate and illustrate them. Referring to the transmission of external impressions, as sensations, to the mind, and to the spontaneous conceptions which issue in voluntary motion, he asks, "How could it be possible to explain these two classes of phenomena if the existence of difference in the fibrils of the same nerve be not admitted?"* Sir Charles Bell, by his vivisections, gave to the notion involved in this interrogation, that precision and certainty which experimental demonstration alone can furnish in such cases.

And so with regard to the encephalon. Long before the time of Gall, speculative physiologists had suggested the probability of its separate parts

* *The Principles of Physiology.* By John Augustus Unzer. Translated from the German by Dr. Laycock, for the Sydenham Society, pp. 68, 69.

sub-serving distinct functions. Only a few years prior to the publication of Gall's doctrine, it was observed by Prochaska, "Since the brain, as well as the cerebellum, is composed of many parts, variously figured, it is probable that nature, which never works in vain, has destined those parts to various uses; so that the various faculties of the mind seem to require different portions of the cerebrum and cerebellum for their production."* It was Gall, however, who gave vividness to this idea, and a certain scientific shape. This deservedly eminent man pursued, in the building up of his system, a strictly physiognomic—or rather cranioscopic—method of observation, and claimed a scientific character for the results, on the ground that the magnitude and configuration of the cranium coincided very generally with the size and form of its contents—a coincidence which obtains for all ordinary estimates, though not with mathematical precision. He compared the prominences distinguishing particular regions of the head, with what he deemed to be some energetic manifestation of psychical peculiarity;

* Dr. Laycock's translation from the original Latin, appended to his translation of Unzer, p. 446.

and, from the correspondences noted, he was led to deduce a natural connexion, and to regard the underlying portion of brain as the organic condition of an associated faculty, just as we consider a particular nervous apparatus of sense to be the anatomical condition of such sense. In this way, Gall constructed Phrenology. Of this system, its most distinguished advocates say, that it supplies the best solution of all difficulties in psychology, in metaphysics, and in moral philosophy; and, above all, that it, and it alone, can disentangle the knotty points that attach to psychological medicine. The system places in some thirty-five or thirty-six categories remarkable states of mind as *faculties*, which, it is maintained, can be so watched in their operation as to yield material for reasoning and deduction, with substantially the same accuracy as the five external senses; and thus that human character, in particular individuals, can be predicated by studying the relative proportion in which the so-called *organs* of the faculties are developed, with the aid of an estimate of outward circumstances upon the combination in which the particular developments occur.

Any sketch of phrenological details would be

superfluous ; they are well known. As a system, phrenology would not appear to have received that confirmation, from extended investigation, anticipated in its earlier history by many able physiologists. If, indeed, innate personal endowment of intellect and moral disposition were something readily ascertainable ; if the influence of inherent aptitudes and tendencies were determinable, from external actions, with anything like moderate exactness ; if, at the same time, the size of separate portions of the encephalon could be verified to a corresponding extent ; and if multiplied observations led actually to uniform results, it must be admitted that Gall's physiology of the brain would have been established as a fact, however inconclusive or vicious should be the reasonings and deductions of individual phrenologists. Coincidences in many cases are undoubtedly noticeable between form of the head and peculiarity of mind ; but a sufficiently wide observation and collection of instances never fail to exhibit discrepancies that completely overthrow the pretensions of *systematic* phrenology. It must still be admitted, I think, that phrenology, like every other honest extravagance, has some

portion of truth underlying it; for, unquestionably, there is much reality in many of Gall's cranioscopic observations. Any one remarking, with an ordinary degree of attention, the form and dimensions of different heads, will very soon perceive that an excessively diminutive one never displays either intelligence or any other force of character; that a small, receding forehead is never the possession of persons eminent for their thinking power, but that usually a capacious front and vigorous intellect go together: that a head very high and broad in the sincipital region, is commonly associated with great natural morality; and that, on the contrary, a low, contracted head is most ordinarily found upon the shoulders of depraved criminals; and, again, that a large occipital and basilar development is generally found in persons of strong animal propensities. More particular correspondences, indeed, may be noted; but the foregoing illustrations will sufficiently exemplify the facts that may be verified without difficulty. But concerning phrenology in detail, as a scientific system, I conceive that the evidence furnished by our more advanced knowledge of the brain and nervous system, alike in man and animals, will

not sustain the particular theory of separate organs for distinct mental faculties.*

In the year 1841, Dr. Carus, who for many years was physician in ordinary to the late King of Saxony, and who has long enjoyed a great reputation throughout Europe as an anatomist and physiologist, published a small volume, containing the principles of a new and scientifically-based

* The reputation of Gall, however, is of an abiding character, quite irrespective of the particular physiology of the brain which he believed himself to have discovered. No investigator of his time did more, if so much, to advance a knowledge, not only of the brain, but of the nervous system at large, throughout the animal kingdom. He was probably the first to insist upon there being an essential distinction between the gray and white nervous matter; and certainly he was the first to show that the relations between the two kinds yield the surest guide to just anatomical descriptions: He was the first to point out that the ventral cord of nervous matter characterising the *Articulata* forms the analogue, not of the sympathetic system, but of the spinal cord of the *Vertebrata*. He threw great light upon the analogies subsisting between the instinctive actions of animals, and certain acts and habits which correspond to them in man. And there are many views upon medical psychology, physical education, and other such subjects, which he did much to establish, if not always to originate. Altogether, science and philosophy are deeply indebted to Gall, whatever becomes of phrenology.

cranoscopy.* In this work, Dr. Carus makes a threefold division of the encephalon, taking that of fishes as furnishing the rudimentary type. "In fishes," says he, "the middle portion (the corpora quadrigemina), which in man is so inconsiderable, is the most important and the most largely developed, whilst, in the higher order of animals, the anterior mass (the hemispheres) and the posterior mass (the cerebellum) are the most conspicuous. In man the characteristic feature is the enormous development of the hemispheres. Further, I have shown that these three cerebral masses, which appear almost in the same relations in the early human embryo as in fishes (that is to say, the middle cerebral mass is the largest), are always to be recognised as endowed with separate and peculiar functions. The posterior cerebral mass is the centre of the primitive fibres of the muscular nerves, and of those of sex. In the middle cerebral portion the primitive fibres of the reparative organs are collected, whilst, in the anterior cerebral mass

* *Grundzüge einer neuen und wissenschaftlich-begründeten Cranoscopie.* Von Carl August Carus. Stuttgart, 1841.

essentially, we find the primitive fibres of the organs of sense, through the medium of which we derive our ideas of sensible objects, and in a higher degree our knowledge. In short, the three cerebral masses stand in relation to the following psychical qualities:—

“1. The anterior cerebral mass (or the hemispheres) is related to the power of representing ideas, to that of recognising and distinguishing them, and to that of the imagination.

“2. The middle cerebral mass (corpora quadrigemina) is related to the sense of the state of organic life (general sensibility—*gemeingefühl*), and to sentiment, or to the feelings which result from the combined action of all our moral faculties.

“3. The posterior cerebral mass (cerebellum) is related to the will, desire, and the instinct of generation.

“As the fundamental elements of mental life are only three—to know, to feel, and to will—so are these three masses the essential portions of the cerebral structure. From these three proceed the three important nerves of sense, those of smell, vision, and hearing, which again correspond to the three great regions of the cranial structures

—the forehead, the middle-head, and the hinder-head.”

This “scientific craniology” of Dr. Carus has never received much attention in this country. Its vices and defects, indeed, are numerous and striking, although it would seem to comprise the germs of certain more recent and now largely accepted teachings. Dr. Carus, in his estimate of the fish’s brain, deems the “middle cerebral mass” to be the analogue of the corpora quadrigemina in the human subject, whereas, by the great weight of authority, it is regarded rather as representing (with the exception of the cerebellum) the great bulk of nervous matter which underlies the hemispheres. Moreover, the propositions generally which this craniology involves, are, I apprehend, not only inconclusive, but, in many respects, incongruous, and the proposed analysis of the psychical principle I take to be most meagre, gratuitous, and unsatisfactory.

Dr. Carus, in the course of his work, maintains the influence of structural size upon functional vigour, representing that a large forehead, for the proper estimate of which he gives minute directions, is the cranioscopic indication of elevated

intelligence; and he appeals for illustration to well-known personages, who are considered to furnish proof of this statement. His analysis of the intelligence comprises the faculties of Conception (Vorstellen), Perception (Erkennen), and Imagination (Einbildung); and he virtually holds that these correspond in strength and activity with the magnitude of the cerebral hemispheres. Yet, with what consistency can it be maintained that the size of the frontal region, the declared index of intellectual power, furnishes, in any of the higher classes of animals, a measure of the volume of the hemispheres? If we advance to the next conclusion attained by Dr. Carus, that Feeling—in what precise significance, very imperfectly explained—resides in the corpora quadrigemina, and that these bodies are developed according to the “dominance of the vegetative life, and of the individual feelings, without enlightenment by knowledge, and without force of will,” we discover nothing that is properly to the point; for, in giving cranioscopic directions, he says that the capacity of the region enclosed by the parietal bones must be ascertained, as a means of determining the degree in which the qualities exist that are allocated in the corpora quadrigemina.

Yet it is sufficiently obvious that it is not these latter structures, but the middle lobes of the hemispheres, that fashion this portion of the cranium. But, probably, the least plausible hypothesis of all is that which assigns to the cerebellum such contrary offices as the sexual instinct, desire in general, and the will; a proposition, I conceive, which is sustainable neither by physical evidence nor metaphysical credibility. Its author, however, maintains that an energetic will and strong desires are systematically associated with a large occipital region, and that this coincides with the volume of the cerebellum. But are the facts as stated? Limiting the inquiry to our own species, have men strong determination and resoluteness of purpose, always, or even generally, in proportion to the magnitude of the cerebellum? And what evidence is there to show that Desire—the *felt* requirement of individuals—is associated specially with this structure, or is any way coincident with strength of *will*? And then, again, however the cerebellum may influence the development of the basilar portion of the occipital bone, it is rather the posterior division of the cerebrum that determines the volume of the occipital region at large.

. And yet, however vague, premature, and unsatisfactory may have been the generalizations of Carus, in his attempts to construct a new physiology of the encephalon, to serve as the basis of a scientifically valid craniöscopy, it cannot be doubted that, in appealing as he has done for his chief support to the animal kingdom generally, and to the laws of embryonic development, he has exemplified a method which can alone reach to conclusions that even *approximate* philosophical certainty; and, for reasons already stated, it may be for a long time—perhaps for ever—impossible to present the results of this difficult investigation with much higher pretensions.

In the year 1846, Dr. Carpenter propounded a physiology of the encephalon, which, however incomplete, is likely to constitute the basis of all future attempts of this description. In an able paper, this distinguished physiologist reviewed the whole state of our knowledge of the brain and nervous system, and, at the same time, indicated the method by which the subject might be most successfully prosecuted; he brought together the scattered facts of this department of science, and gave to them a certain precision

and unity, with rare sagacity and skill.* In more recent publications he has still further elaborated his views, and has so marked out and defined our best established knowledge, and indicated the most probable opinions, that important results are exhibited and suggested when they cannot be distinctly affirmed:

The more closely, indeed, Dr. Carpenter's views are examined, the more clearly does the correlation of psychology and physiology reveal itself. But he himself would not claim for his doctrines all the fulness and perfection which they may be expected to attain. It is but right, however, that physiologists and psychologists (and they are not few) who avail themselves of his thought as their starting-point, should candidly and honourably acknowledge the fact, even when it may not receive a development from

* The paper mentioned in the text appeared in the *British and Foreign Medical Review* for October, 1846. It was an anonymous article, written editorially; but its authorship was never disguised. It was professedly a controversial review of a work by the present writer, in which he advocated the phrenological system. It was principally owing to the facts and arguments advanced in the paper in question, that he was led to his present conviction that phrenology, as a system, is unsound.

them altogether identical with that which it has obtained from himself.

Dr. Carpenter's chief propositions are, that the Cerebral Hemispheres supply the organic conditions of all psychical action which involves Ideas; and that the Nervous Masses situated above and in advance of the medulla oblongata, and underneath the cerebrum proper, constitute the encephalic centres of the various kinds of Sensation. And, certainly, there is noticeable in the consciousness as obvious a distinction between thought and feeling, as in the anatomy between the cerebral hemispheres and the underlying structures.

But I shall bring out Dr. Carpenter's views most clearly in the ensuing summary of what I deem to be the probable, and the more than probable, physiology of the nervous system and the various portions of the encephalon, pointing out the correspondence in some detail between it and the more prominent facts of psychology. In pursuing this design, however, I shall exhibit some difference of opinion with Dr. Carpenter, on grounds which I shall state as I proceed.

CHAPTER III.

THE NERVOUS SYSTEM AND ITS FUNCTIONS.

I ASSUME that the reader has already some general acquaintance with the anatomy of the nervous masses. He will, then, be aware that, whilst their structure has everywhere a certain similarity in appearance and general character, there is yet an obvious divisibility of it into two distinct kinds—the gray and the white; a divisibility which appertains alike to the nerves, the spinal cord, and the encephalon. The difference in these nervous substances is not an affair of colour merely; it applies also to their intimate structure and organization. The white matter is made up of bundles of tubular fibres, whilst the gray is composed of aggregated cells—now very generally denominated the *vesicular neurine*. To collections of this vesicular tissue the term *ganglion* is very generally applied, because the knots of nervous matter which were formerly supposed to give origin to the nerves, and which are dis-

tributed so largely throughout the body, are vesicular in their composition. And thus the identity in structural constitution has led to the employment of the word *ganglion* as a common term. But the ganglionic or spheroidal form of the mass is not at all essential, as was at one time supposed, to the constitution of what is now called ganglionic substance.

Physiological and pathological research has rendered it more than probable that the vesicular and the fibrous substances have generically distinct offices in the animal economy. Gall, noticing the extraordinary vascularity of the gray tissue, taught that it was the first-formed, and that it constituted the producer and the *matrix*, as he called it, of the white substance; a fact which he enunciated as universal in reference to all the nervous masses. But this theory is now exploded, and has no hold upon physiologists of the present day. It is very generally considered that the functional distinction is this: the ganglionic structures constitute the seat of primary *change*, whilst the fibrous matter is for conveying and distributing the influence originating in the vesicular neurine. Considering these two substances histologically, there is no reason for

regarding either of them as having genetic relations with the other.*

In studying the vital characteristics of man and animals, aided by the lights of anatomy and physiology, we judge of their sensibility and psychical endowment generally, by watching the phenomena which exhibit themselves in movement and other expressions of activity and consciousness; and, in deducing conclusions concerning the springs and the quality of particular actions and conduct, we look very properly to the analysis gained in the introspection of ourselves. Thus premising, I shall pursue the several processes which take place through the instrumentality of the nervous structures; commencing, in the present chapter, with the more simple manifestations of function, and, in succeeding ones, proceeding by ascent, as it were, until we attain the more elevated displays of psychical capability.

I shall first make a few remarks upon the ganglia of the so-called Sympathetic system of nerves. These ganglia are scattered largely

* In the explicit promulgation of this ganglionic theory, Mr. Solly shares, probably, in the most eminent degree. See his work on the Brain, published in 1836.

throughout the body ; in front of the vertebral column they form two distinct and regular chains, the whole being connected by nervous filaments extending in every direction, and especially accompanying the blood-vessels. The precise function of this portion of the nervous system is somewhat obscure. Consciousness can hardly be supposed to have place in its exercise. It most likely communicates a susceptibility to certain motions involved in the processes of circulation, nutrition, and secretion ; an influence not needed for the simple accomplishment of these functions, but, in the animal economy, required that they may have relation with, and become in a manner subordinated to, the higher operations of the nervous system.

That the functions purely organic are, in some way or another, under the influence of the nervous system, in man and the higher classes of animals, is undoubted ; and that this influence operates immediately through the sympathetic, is inferred from the following, amongst other circumstances :—

The anatomical distribution of this system affords antecedent probability to such an estimate of its functions ; but numerous facts exist

which give to this view a much higher character than that of mere hypothesis. Numerous experiments and pathological facts exhibit the prejudicial influence which lesions of the nervous system exercise upon the various organic functions; and there is good reason for attributing such influence immediately to loss or perversion of the sympathetic activity. According to Magendie and Longet, the destructive inflammation of the eye which follows division of the fifth pair of nerves takes place much more rapidly when the division has been made anteriorly to the ganglion of Gasser, than when it has been made posteriorly to it and near to its encephalic origin; the sympathetic filaments which largely exist in this pair of nerves upon its emergence from the Gasserian ganglion being interrupted only in the former case on their way to the tissues.* And of a still more decisive character are the facts brought out by Dr. Axmann, of Berlin, in the experiments which he instituted upon frogs, some years ago, when attempting to elucidate this department of physiology. Upon dividing the cranial nerves at their origin between the spinal cord and spinal

* Carpenter's *Human Physiology*. Fifth edition, p. 783.

ganglion, he found that paralysis of motion and sensation ensued, without sensible prejudice to the purely organic processes. On the division, however, being made between the ganglion and the communicating branch of the sympathetic, there resulted, in addition, pallor of the skin, partial desquamation of the epidermis, softening and friability of the tissues, minute extravasation of blood, and œdema. Upon these experiments, Romberg has the following remarks:—"If the sciatic nerve is divided below the part at which the fibres of the communicating branch, or, in other words, sympathetic elements, are introduced into it, we find disturbances in the circulation, which are distinctly manifested in the web of the foot. The circulation is rendered inolent and irregular; the dilated vessels are overcharged with blood-corpuscles, and in a few vessels the blood is arrested." *

It is known that certain drugs act upon particular divisions of the nervous system by a sort of elective affinity, and it is observed that some poisonous substances exert their primary in-

* *Nervous Diseases of Man*. Dr. Sieveking's translation for the Sydenham Society, vol. i., p. 196.

fluence upon the respiratory movements, which are mainly under the control of a system of nerves distinct from the sympathetic; whilst others, in the first instance, arrest the heart's action, presumably from injury directly done to the sympathetic. "Poisoning with tobacco and arsenic," says Romberg, "paralyses the cardiac nerves and arrests the circulation, while respiratory movements continue. . . . On the other hand, the West Indian arrow-poison paralyses the respiratory and voluntary movements, at the same time that the action of the heart continues, and may be kept up by artificial respiration."* Chloroform and sulphuric ether, when inspired, do not exercise their paralysing influence uniformly upon the several divisions of the nervous system. "The functions of the medulla oblongata and nerves of respiration," says Dr. Snow, "can be arrested by a smaller dose of the vapour than that which is required to arrest the functions of the ganglionic (sympathetic) system of nerves, on which the contractions of the heart depend."†

Disorder of the organic functions sometimes

* *Op. citat.*, vol. ii., p. 335. //

† *Association Medical Journal*, April 6th, 1853.

takes place in but one of the symmetrical halves of the body, as if from some corresponding perversion of nervous agency. Sir Henry Holland has related cases in which copious perspiration was limited in this way.*

Altogether, the evidence favouring the theory which assigns to the Sympathetic nervous system a controlling influence over the processes of circulation, nutrition, and secretion, is, from its cumulative character, exceedingly strong, although it may not amount to an actual demonstration.

Whatever may have been the obscure and speculative anticipations of earlier physiologists and pathologists, such as Unzer, Prochaska, Whytt, Cullen, Hunter, and Blane regarding the physiological agency of the so-called medulla spinalis, it is undoubtedly true that science is indebted to the late Dr. Marshall Hall for *demonstrating*, alike by experiment and pathological facts, that this structure is a source of nervous power, independent of the encephalon, and for convincing reasons that its influence in the production of muscular movements may be exerted without any attendant consciousness. However

much Dr. Carpenter, Mr. Grainger, the late Mr. Newport, and others may have done for establishing and systematizing this doctrine of the spinal cord, the merit of *discovery* belongs properly to Dr. Marshall Hall. This branch of physiology, and the foundations upon which it rests, may be stated briefly in the following terms:—

When an irritant impression is made upon the mucous and cutaneous surfaces, a respondent movement ensues, unless the restraining influence of the will, or some other qualifying circumstance, prevents it; and this movement does not necessarily involve any consciousness whatever. The impression wrought upon the superficial nervous substance is conveyed by fibrous filaments to the vesicular neurine within the spinal cord, in which a vital change occurs, developing a force which expends itself in an outward direction, and, through other filaments, induces muscular contraction.

Although not actually demonstrated, it is yet a very rational hypothesis, based upon analogy, that, distributed largely and very minutely along the several surfaces, there exists vesicular neurine, forming the peripheral expansion of nervous

filaments, that may be likened to the structure of the retina, as it expands itself behind the vitreous humour.

It is received doctrine, that the gray matter continuous throughout the whole length of the spinal cord forms the analogue of the ventral ganglia separate in the *articulata*. If one of these latter creatures—the centipede, for example—be divided into separate parts, each segment will move upon the application of an outward stimulus. Amongst vertebrated animals, in which a coalescence of ganglia in the spine has place, frogs exhibit such movements very strikingly. If the skin below the head be irritated, after detachment of the encephalon from the cord, motion, the same in its outward character as that which ordinarily follows upon sensation, will ensue. The unconscious nature of this phenomenon becomes still more obvious when that portion of the cord which is immediately above the origin of the crural nerves is divided; irritate the hind legs under such circumstances, and they are seen to retract in the most lively manner. Corresponding phenomena may be observed in the higher classes of animals after decapitation. Even in man, certain pathological states which

involve some breach of continuity between the encephalon and spinal cord, also the quasi-instinctive actions noticeable in anencephalous foetus, will show the same thing—involuntary movements, respondent to an impression of which there is no sensational consciousness.

Movements taking place under the circumstances described have been denominated *reflex*, *excito-motory*, and *automatic*. None of these expressions constitute very exact definitions; but provided the function designated be rightly appreciated, the particular term employed is only of secondary importance, however desirable in every branch of science correct nomenclature may be.

The purpose of the spinal axis and its reflex function would appear to be the conservation of the organism, by excitation of the respiratory acts—in so far as they are involuntary, by governance of the orifices of ingress and egress, and by contribution to the integrity of some other processes in which reflex movements participate.

The primary and more simple forms of *consciousness* show themselves coincidently with the nerves and ganglia of the senses which consti-

tute, the media through which impressions are obtained of the physical qualities of objects. Although, under some circumstances, sensation may be excited by internal conditions, it ordinarily develops, in the percipient, a consciousness of *outness* as regards the excitant. The *external* senses, as in consequence they are called, receive the impressions of smell, taste, hearing, sight, and touch; they are associated with collections of vesicular neurine situated above the spinal cord, protected, in the higher classes of animals, by the bones of the skull. These *sensory ganglia* are—presumably, when not demonstrably—in direct communication, by white nerve-fibres, with vesicular neurine expanded on the surfaces forming the special regions of the particular kinds of sensibility. Upon these surfaces the fitting influences exert themselves; and, upon the extension of these latter to the encephalic centres, consciousness of that subjective change denominated sensation becomes excited, and is commonly followed by the recognition of some agent, or force external to the sentient principle itself. But it is here—at the very threshold of physiological psychology—that the demonstrability of modern doctrines becomes less com-

plete than in the more physical departments of the science of life. Such as they are, however, I proceed to set them forth.

Vesicular neurine distributed upon the lining membrane of the nostrils possesses a specific impressibility to odorous matters; the impression which these make is conveyed by conducting fibrous filaments to the *bulbi olfactorii*, the ganglionic centres wherein the sense of *smell* is exercised.

The vesicular expansion of nervous filaments upon the lingual surface and the palate are specifically impressed by sapid particles; and the impression being passed along fibrous filaments to the proper ganglionic centres, induces the consciousness of *taste*. There is some uncertainty concerning the nervous apparatus of this sense, in great measure owing to the mixture of filaments from different nervous trunks on the gustatory surfaces. But the special character of taste as a sense, and the distinctness of its nervous filaments and central ganglia can hardly be doubted; a conclusion which upwards of twenty years ago I was at some pains to establish in the pages of the *London Medical Gazette*, resting such arguments as I could adduce upon certain

cases of paralysis that had come under my own notice, showing the abolition of tactile with persistence of gustatory sensibility in the tongue, and *vice versa*.

Vesicular neurine spread largely within the internal ear receives the vibratory undulations constituting the external cause of sound; the fibrous filaments of the auditory nerve conduct the influence to certain gray nuclei in the posterior pyramids of the medulla oblongata that form the ganglia of *hearing*.

The retina is largely composed of vesicular neurine; visual impressions are carried along the course of the optic nerves, and attain the corpora quadrigemina, which there is good reason for concluding to be the ganglia of *sight*.

The four modes of consciousness just recounted being accomplished by distinct nerves and organic apparatuses, limited to particular regions of the body, have been denominated the *special senses*.

But there is developed a sense-consciousness not limited to any particular organ, but referring itself more or less to the whole frame—*common sensation*. This sense resides principally in the skin; it is especially acute at the mucous orifices; it exists, however, in the interior tissues, but in a

degree less intense. It is best illustrated by the simple notion of *resistance*. Its modifications comprise the several impressions essential to ideas of the hard, the soft, the rough, the smooth, the hot, the cold, the moist, the dry, and so on. It is, moreover, through this sensibility, I conceive, that we appreciate the state of the muscles—experience the *muscular sense*.

This fifth sense is, presumably, awakened through the vesicular extremities—the peripheral expansion—of fibrous filaments. Whether the gray substance and white fibres originating and conducting common sensation be the same as those which subserve the spinal reflex function is uncertain. But this much may be admitted, the communicated impression ascends along the posterior columns of the spinal cord, and, attaining gray vesicular centres, produces a consciousness of *common sensation*.

Physiologists are not agreed as to the identity of these ganglionic structures; they may be expected, however, like the other sensory ganglia, to be somewhere at the base of the encephalon; and I am, myself, disposed to think that the vesicular nuclei within the lateral lobes of the cerebellum—the corpora dentata—constitute the

encephalic site of this sense." Many years ago, Foville assigned this function to the aggregate cerebellum; and others, with great plausibility, have advocated this opinion. Dr. Carpenter, however, in his *Human Physiology*, argues against it, on the ground that neither ablation of the organ by operation, nor the destruction of it by disease, have been found to involve the loss of any sensorial capacity. But there may be considerable doubt as to whether, in recorded cases of this kind, the ganglionic extremities of the upper and posterior portion of the spinal cord—the cerebellic termination of the so-called restiform bodies—were actually lost, even though the lobes and their cortical vesicular investment should have disappeared. I doubt if the extension of disease or of experimental excision to structures so closely contiguous to the medulla oblongata as these corpora dentata, would be compatible with the maintenance of functions essential to life; although the removal or destruction of the bulk of the cerebellum, might suggest no such difficulty. Besides, it is notorious that, in the case of animals, movements purely reflex will sometimes be mistaken for those indicative of common sensation. But, probably, the cases already observed with

respect to this point, are too few for any decisive conclusion.

Dr. Carpenter, in his later editions, admits the probability of the inferior ganglia of the cerebellum—the corpora dentata—constituting the encephalic region of the *muscular* sense. But is there good reason for deeming this to be anything else than common sensation as resident in the muscles? That there is, some metaphysicians, and some physiologists also, appear to think. Dr. Thomas Brown held that the sense of resistance was specific, and that the entire muscular frame constituted its external seat and apparatus; and amongst modern physiologists, Sir Charles Bell, in language somewhat ambiguous and obscure however, suggested the same thing. But what, upon close analysis, is the muscular sense but the feeling of tension in the muscles? If we regard this feeling in its several modifications, it seems to be identical, in all essential respects, with variations of sensation in the skin. In its primary degree, simple cognition of muscular tension is obtained; as it becomes intensified, *fatigue* is experienced, then *ache*, and, in its last measure, acute *pain* may be felt, as in spasm. Thus, I raise some physical object of moderate weight;

it is pleasant exercise, and the tension felt in the brachial muscles is grateful. The weight is increased, and fatigue is very soon experienced; again, there is an increment of weight, and my arm aches; cramp finally ensues, and sensational pain has its seat in the muscles. Have we not engaged, in such a case, the same sense as that which is common, more or less, to all the body? Any internal estimate, or apprehension, of the *degree* of resistance, and consequent amount of muscular tension, as in determining the gravity of any object, or the force requisite for moving it, is obviously a mental operation, not to be confounded with any mere sensation.

The anatomical connexion which exists between the corpora dentata and the posterior columns of the spinal cord, through the corpora restiformia, favours the hypothesis which I have advanced; and various physiological and pathological facts would appear to strengthen it. The experiments of Magendie and Longet show that the slightest touch of the restiform bodies induces violent pain.* Hutin relates a case in which the sense of touch was so exalted, that, upon the

* Romberg, *Op. citat.*, vol. i., p. 158.

least contact, intolerable pain and restlessness ensued, with corresponding muscular contractions, resembling those produced by an electric discharge. The patient, ultimately died in the most terrific convulsions, prostrate and exhausted. On examination after death, there was found, amongst other changes, atrophy of the cerebellum. "Its medullary centre, as compared with that of another subject, was a third less in size in either hemisphere. The white substance, which in the normal condition occupies the centre of the corpus rhomboidale, had ceased to exist, so that the fimbriated margins of this portion approached the centre, and only formed a small pyriform, very hard, grayish-brown body."*

Mr. Robert Dunn, of London, a very acute and reflecting practitioner, published a few years ago an interesting and instructive case of tubercle in the brain, wherein there was noticed, amongst other phenomena, imperfect paralysis of the right arm and leg, consisting in failure of common sensation. The patient was a little girl about two years old. "She could move her arm about," says Mr. Dunn, "and could grasp anything firmly

* *Ibid.*, vol. ii., p. 80.

enough in her right hand, when her eyes and attention were directed to it; but, if they were diverted to something else, and the volitional power withdrawn, she would let the object which she had been holding fall from her hands, and without being conscious of the fact." Describing the post-mortem appearances, Mr. Dunn states, "On making an incision through the lateral lobes of the cerebellum on the left side, I found I had cut through a tubercular deposit, a little to the outer side of the median line (the site of the corpus dentatum), in a state of softened degeneration."*

In the communication, however, in which these facts are recorded, Mr. Dunn objects to the view which I have taken concerning the encephalic region of tactile sensibility, mainly on the ground that the amphioxus—a species of fish low down in the scale—has no cerebellum. No valid argument, however, can be drawn from such a circumstance. With such beings as the fish in question, we can with confidence affirm but little, either of their sentient endowments or of the analogies of their nervous structures. What, in

fact, can we pronounce regarding the tactile sensibility of a creature like the amphioxus? But, if we concede to it such a sense, it may be observed that it has a spinal cord, at the upper extremity of which there is, I presume, vesicular neurine, and a portion—that which is in direct connexion with the posterior division—must form the analogue of the corpora dentata in the mammalian cerebellum, even though the cerebellum itself fully developed should not exist in this fish.

The hypothesis which I have advanced would seem to reconcile in some degree the doctrine of Gall with that of Flourens. Gall taught that the entire cerebellum was the organ of the sexual instinct; and Flourens (supported in his opinion by many modern physiologists) maintained, many years ago, that its office was to co-ordinate muscles acting in combination at the mandate of volition; and from this view has been deduced the idea, that it exercises a special influence in balancing the body. Now, if the inferior ganglion of the cerebellum subserve ordinary feeling—common sensation—its connexion with the function imputed to it by Gall is sufficiently intelligible, without adoption of the phrenological doctrine. Numerous facts, certainly, appear

to indicate some relation between the cerebellum and the organs of generation; but such facts receive an interpretation just as rational by reference to the exquisite tactile sensibility of these latter, as by unqualified admission of Gall's teaching upon the subject. With reference to Flourens' notion concerning the muscular office of the cerebellum, the facts appearing to sustain it receive some probable explanation by admitting the possible influence of what may be called the superior ganglia of the cerebellum—its vesicular cortical investment—in determining to the muscles some action respondent to their feeling. The experiments of Budge and Valentin demonstrate an apparent influence of this portion of its structure upon the *testes* and *vasa deferentia*, which were seen to retract when it was irritated.*

If, indeed, the doctrine be ultimately established which assigns to the cerebellum the co-ordination of muscles in voluntary movement, it perfectly comports with my own view concerning the ganglia of common, or tactile sensibility; for, as Dr. Carpenter remarks, "all voluntary move-

* Romberg, *Op. citat.*, vol. ii., p. 39.

ments require the guidance of sensations, and most of these are of the *tactile kind*.”*

Let the whole case, however, be as it may, common sensation must have its proper ganglia somewhere; and it cannot be doubted that these, through the spinal cord, are in some sort of nervous connexion with every sentient structure.†

All the sensory ganglia, it may here be noticed, besides being instrumental in producing the simpler modes of consciousness, very often cause reactions in the muscular system, when, through afferent nerves, they are stimulated from without; and that, too, in frequent independence of thought or volition. It would seem that impressions received in a particular ganglion of sense may in some manner be diffused through a whole chain of connected ganglia, and so bring about respondent movements of very varied character. These Dr. Carpenter designates *con-*

* *British and Foreign Medical Review*, vol. xxii., p. 510.

† The reader will understand that, with respect to any hypothesis advanced in this little work, the individual facts cited in its support are not offered as *proof*, but simply as exemplifying the *kind of evidence* which, by accumulation, might substantiate it.

sensu, not in the meaning of *consentaneous*, but as occurring *with*—in some sort of dependence upon—*sense*. A young infant, long before distinct thought can have been awakened, exhibits restlessness from contiguity to its mother's bosom, provoked, it is probable, by the odour of the mammary fluid. An odious taste, simply, may determine the involuntary act of vomiting. A loud and unexpected sound will occasion transient, but very general and intense, contraction of the muscles, as in starting. The eye, when dazzled, is rapidly and instinctively withdrawn from the light; and a sudden dash of cold water provokes deep inspiration and audible sobbing. These muscular actions are *reflex* as to their modes of occurrence, but they differ from the reflex actions purely spinal in being essentially dependent upon conscious states; and they differ from ordinary movements in the circumstance that neither volition, nor ideas, nor mental emotion, properly speaking, are concerned in their production.

There are other sensibilities which are external as to their related objects, but which do not form media of information as to the world without; and, on this account, they do not come within any of the foregoing categories. These comprise

the physical appetites, including *hunger* and *thirst*. Nothing is made out with respect to any ganglionic centres of such affections. If they exist as distinct nervous masses in the encephalon, they should be found probably at its base, in which situation there is much vesicular neurine, the function of which is not ascertained. But, upon this subject, conjecture, resting upon analogy, is alone available in the present state of inquiry.

CHAPTER IV.

THE EMOTIONAL SENSIBILITY AND ITS ENCEPHALIC SITE.

THERE is yet a sensibility more elevated in the psychical scale than either external sensation or the physical appetites ; I refer to that all-pervading sense of substantive existence which German psychologists have named, in some of its phases, *Cænæsthesis*—general feeling, and sometimes self-feeling (Selbst-Gefühl). It connects itself, apparently, with the peripheral termination of sentient nerves throughout the whole body, but particularly of those supplying the thoracic and abdominal viscera.

Emotional Sensibility, as in the whole of its modifications it may not be inappropriately designated, is experienced in an especial manner about the præcordial region. Its local intensity, indeed, would seem to correspond very much with the prevalence of the vascular system. Under appropriate influences, this sensibility, al-

though more or less general, is always most acutely experienced in the neighbourhood of the large vessels, and most of all about the centre of the circulation; and hence we have the popular as well as poetic localization of "the feelings" in the *heart*. Yet emotional sensibility is not, like external sensation, of a quasi-physical character; it certainly is not the tactile sensibility of the vascular tubes, which may be affected by many causes influencing the circulation, without there being any resultant effect upon "the spirits"—another form of popular phraseology, which sufficiently indicates, in certain respects, the varying states of this so-called cænæsthesis.

Under ordinary conditions, this peculiar mode of consciousness is recognised as tranquil contentment. When it is gratefully exalted, we are said to be in capital spirits, glad at heart, joyous; we are ready for anything—in *high feather*. When it is painfully depressed, we are anxious, low-spirited, dull and heavy; we have no heart for exertion, we are thoroughly *down*. And, of course, there are states intermediate, which vary both in kind and degree. These modifications may be determined by causes chiefly physical, or by causes which, in their origin, are altogether

psychical. All persons have their spirits more or less acted upon by conditions of the atmosphere, and by states of the viscera. Go back in memory to the damp, foggy days of dark November, and recal the dispiriting influence of their desolation and gloom. The relation between visceral conditions and the feelings, is the theme of perpetual recognition ; witness the importance of a sound digestion and a healthy state of the liver to the maintenance of moral contentment. Moreover, the varying forms of this emotional sensibility stand in well-noted correspondence with determinate modes of thought. Ideas of loss and damage, physical or moral, spring up and have a certain abiding character, so long as the cænæsthesis experiences depression ; and, on the contrary, trains of thought suggestive of personal advantages arise when this sensibility is peculiarly exalted. And, conversely, physical elevation and depression ensue under the direct influence of correlated forms of thought. But this particular topic will receive more extended consideration in another chapter.

Emotional sensibility has sometimes been regarded as simply a mode of common sensation. But a little reflection upon the peculiarities of the

respective phenomena will bring out essential differences. In the first place, *emotional* sensibility maintains no sort of correspondence with that which is *tactile*. On the contrary, when the former is greatly elevated, the sense of touch is sometimes abolished, or suspended. Witness the effects of heroic enthusiasm; impressions merely tactile are but little regarded in these circumstances of emotional exaltation. The excited warrior, in the thick of battle, *feels* neither the sabre's cut nor the cannon's stroke. Again, the tactile sensibility may be most acutely awakened in the absence of all emotional excitement; internal spasm, neuralgia, and certain cases of local hysteria, show this phenomenon. Nay, the emotional sensibility, when greatly exalted, may very often be lowered by superinducing bodily pain—intensifying tactile or common sensation. In that extraordinary epidemic of the middle ages, the Dancing Mania, so admirably described by Hecker, the paroxysms (understood to have been the re-action ensuing upon some morbid emotion) were most effectually interrupted or subdued by blows and kicks; the operation of these, it may be presumed, having been to bring about sensational, and thereby to weaken

emotional, sensibility. The patients, at the height of their excitement, seem to have had the external senses literally sealed. "While dancing," says Hecker, "they neither saw nor heard, being insensible to external impressions through the senses."*

Reil, upwards of sixty years ago, maintained that the cænæsthesia had no physiological identity either with tactile or any other form of outward sensibility; and he went even so far as to say, that "if an animal could be deprived of every organ of external sense, such an animal would yet, by means of the cænæsthesia, have some sense more or less obscure of its own existence."†

The action of particular medicines, operating through the blood upon the ganglionic centres, suggests both an anatomical and physiological distinction between the nervous apparatuses of sensation and emotion. Opium and other such drugs, whilst they depress tactile sensibility, exalt very often that which is emotional.

* *Epidemics of the Middle Ages*. Sydenham Society's Edition, p. 88.

† Cited in the *Annales Médico-Psychologiques*, Avril, 1856, p. 250.

Now, for this more elevated and specific sensibility there must, I apprehend, be proper ganglia within the encephalon. Dr. Carpenter refers this function to the sensory ganglia at large, and particularly to the ganglionic centres of common sensation; entertaining the opinion, with some other physiologists, that the structures commonly called the optic thalami, are for the fulfilment of this latter office, and that the contiguous ganglia, the corpora striata, are most likely the source of movements respondent to sensation.* Having myself already suggested that the inferior ganglia of the cerebellum, the corpora dentata, constitute the centres of tactile sensibility, I would now submit that the ganglionic masses forming the floor of the lateral ventricles—the optic thalami and corpora striata—constitute, in all probability, the ganglia of emotional sensibility, divisible, it is likely, according to

* The fact of the sensory tract of the medulla oblongata (shown to be such by the origins of the sensory nerves) having its chief termination in the thalami optici, has been regarded as the strongest proof that these ganglionic structures are the seat of common sensation; but this circumstance can only make it likely that they have *some* sensorial function, which, on grounds of mere antecedent probability, we may just as well suppose to be cænæsthetic as sensational.

specific differences, in the manifold forms of this latter.

Comparative anatomy would seem to favour this view. In the lower species of vertebrated creatures, the admitted analogues of the optic thalami and corpora striata are exceedingly large in proportion to the rest of the encephalon. In fishes these structures are voluminous, whilst the cerebral hemispheres are, in some instances, not discoverable, and are, in many others, quite rudimentary. And so far as we can reason concerning the psychical endowments of fishes, we should infer that some inward sensibility, apart from the sense of touch, principally determined their numerous movements; these being mainly subservient to their self-conservation, and having comparatively but little relation to outward circumstances. In this state of things we should, *à priori*, deem their prominent sensibility to be cænæsthetic in its nature, rather than tactile; but, of course, not to the exclusion of this latter, though in the watery element there would appear to be no predominant need for it.

The encephalon of birds does not exhibit quite so preponderant a size of the ganglia under consideration; they are still very large, however, in

proportion to the cerebral hemispheres, which now become more developed; and it seems reasonable to ascribe the instinctive and habitual movements and actions of the feathered tribe in a great degree to sensibility of an emotional character. When we come to the mammalia, and progressively ascend the scale, we find the whole conscious life of the different creatures becoming less and less a mere sensibility, and more and more an intelligence; the highest forms of which latter are discovered when we arrive at man. And, with our own species, emotion, as an independent and primary source of action, is noticeably at its lowest point, abundant though it remain.

These facts correspond very generally with the relation, as to volume, which the hemispheres of the brain and the presumed emotive ganglia maintain towards each other throughout the animal kingdom. The lower we descend in the scale, the more do these latter masses go to make up the encephalon, and, in the same correspondence, the more do actions appear to spring from some instinctive, unintelligent source—most likely emotional sensibility.

Vivisections practised upon the nervous centres

are of no great value in determining function, excepting in so far as the results may serve to corroborate some inference otherwise obtained. It was found by Dr. Budge that irritation of the corpora striata and corpora quadrigemina—these latter being immediately contiguous to the optic thalami—excited vivid peristaltic movements.* A like result is a very ordinary effect of sudden and intense emotion.

The evidences of morbid anatomy, as elucidating inquiries of this nature, are also but little conclusive. Andral's numerous published instances in which there was found extravasation into the optic thalami do not, however, show any coincident lesion of tactile sensibility in the majority of cases: a result which might have been anticipated, in a large proportion of them at least, if these masses had been the ganglia of common sensation. Perversions of the emotional sensibility have had too little account taken of them in these investigations, for the existing records of morbid anatomy to be made available, to any extent, for or against the hypothesis now under consideration.

*See *London Medical Gazette*, vol. i., for 1839-40.

But as exemplifying the kind of evidence from morbid anatomy that might be brought to bear, though not decisively, upon an investigation of this kind, I will cite two or three illustrative cases.

In the autumn of 1853, I assisted at the *post-mortem* examination of a case in which, during life, there had been unusual manifestation of emotional sensibility, without any intellectual disturbance. The right corpus striatum alone afforded signs of morbid change. Notes were taken at the time by Mr. Walsh, surgeon, of Manchester, who had attended the patient, and from these I am favoured with the following account:—James Connor, aged fifty-six, was a man of temperate habits, and one who through life had enjoyed good health and spirits, until within two years of his death. At this period he became involved in pecuniary difficulties, and hereupon low-spirited and somewhat unsocial. He continued to follow his business, however, as usual. Two months before his death he embarked the remains of a small capital in some speculative undertaking, which issued in complete and immediate failure; a circumstance which very seriously aggravated his mental depression. A fortnight after this catastrophe he was seized with slight

paralysis of one arm, which, however, disappeared spontaneously in about a week. But it returned in a few days with increased severity, general hemiplegia, indeed, showing itself. The affection, to some extent, involved both motion and sensation; and articulation was very indistinct. "At this time," says Mr. Walsh, "I was sent for. I found his general health not bad. Though both motion and sensation were affected considerably, neither was abolished; the tongue appeared to be the most affected, especially when attempts were made to converse. There was some impairment of vision, but the pupil showed no change. The intelligence was undisturbed, and but little enfeebled. *His emotional excitability was remarkable, the most trifling circumstance being sufficient to provoke it. When I visited him, he was literally overjoyed, and when I took leave, he would grasp my hand and burst into tears. At my last visit, twenty-six hours before his death, there was but little change in his general condition, except that he was weaker; still he was able to be up and out of bed. When I left him on this occasion, the emotion displayed was truly distressing. He rested badly the ensuing night, moaning much at intervals; next morning he*

became drowsy, and towards noon was slightly convulsed. He expired at six P.M.; November 18th, 1853. On examining the head, eighteen hours after death, the vessels of the scalp were empty; the superior aspect of the cerebrum was natural, the convolutions a little flattened probably. On raising the whole encephalon, a considerable quantity of serum, slightly tinged with blood, was found at the base. The consistence of the cerebral substance was good, and, on slicing it, very few *puncta vasculosa* were observable. Fluid similar to that discovered at the base, occupied also the ventricles in considerable quantity. The choroid plexuses were not congested, but *over the right corpus striatum* there ramified several large vessels. On cutting into this structure the gray colour was found deepened, and blood flowed from a number of points, forming in these respects a striking contrast to its fellow on the opposite side, as indeed to all the rest of the encephalon. The cerebellum was quite natural.”

The following communication from Dr. Fripp, of London, comprises particulars of a case very analogous to the one just related:—“A gentleman intimately known to me, one who possessed

considerably more than ordinary powers of mind and attainments, and one whose strength of purpose and firmness were among his most distinguishing characteristics, was seized, without previous warning, with forgetfulness of words, in the midst of a very active career, involving ceaseless occupation of mind and body. Perfect quietude and gentle medication very speedily succeeded in restoring this failure, and he appeared well again. But it was impossible to restrain his ardent desire for activity by the most explicit announcement of what this symptom in all probability indicated. In about two months sudden and complete confusion of memory occurred, producing the strangest jumbling together of true and false that I remember ever to have witnessed. This was followed by partial paralysis of the left arm and facial muscles; and, at the same time, *great emotional excitability showed itself*. It is worthy of remark that, apart from the affection of memory of recent events—which itself underwent considerable improvement—there was no impairment of intellect to be recognised. His conversation upon abstract topics, and on whatever appealed to the reasoning powers, was as clear and forcible as ever; and his quiet indo-

mitableness of will showed itself in many characteristic ways. Yet he was at this very time, and whilst the memory was improving, *moved to tears—a thing quite strange to him—by the slightest occasion of feeling, even by a kind word, and the sight of a friend.* After some considerable apparent amendment, and an amount of re-application to various objects of former interest and occupation, which it surprises me now to think of as possible in such a condition, he suddenly became apoplectic, and died within ten months of the very first intimation of disease.

“Besides evidence of some meningo-cephalitis on the surface, chiefly on the right side, the main result of the *post-mortem* inspection was the disclosure of a large mass of dirty gray softened cerebral substance in the central part of the right hemisphere, on a level with the corpus callosum, and principally over the posterior part of the corpus striatum. *This portion of the corpus striatum was itself softened, and as though corroded,* and liquified matter filled the descending corner of the corresponding lateral ventricle. The thalamus was sound, as also every other part of the encephalon appeared to be, after a most searching examination.

. "What struck me, as a point of connexion between this case and your views of the functions of different parts of the encephalon, was, I need hardly say, the prominent development during its progress of emotional excitability, and the damaged corpus striatum, with perfect integrity of the meso-cephale apparent after death. But to enable you to judge more fairly how far this connexion deserves to be regarded as essential, I have briefly stated all the other leading particulars of the case."

Certain features in Mr. Dunn's already cited case, seem to have a pathological significance similar to that of the instances just adduced. In describing the psychical symptoms that were noticeable in his little patient, Mr. Dunn says:—"She manifested one peculiarity of disposition with which her parents, who are sensible and intelligent people, were much struck, and that was her extreme excitability. They have other children, and the contrast in this respect between them and her became a matter of daily observation. Passing incidents and events, scarcely noticed by them, would throw her into the excesses of joyous emotion, or bring tears of distress into her eyes, so great was her susceptibility to emotion

and excitement." And further on in his account, recording her condition a short time before death, he states that "the mother never got a quiet night; she always awoke in trouble and distress; she was not an obstinate or self-willed child, but affectionate in the extreme, and readily soothed by her parents. When any disagreement had arisen between them, or with any other member of the family, she was in great distress of mind until a reconciliation of the most affectionate kind was effected. As her weakness increased, she underwent a change of disposition, and became greatly depressed. She was at times subject to great uncomfortableness and depression of mind; but her emotional excitability was gone—she was, on the contrary, lethargic." In an account of the results of the *post-mortem* examination in this case, the subjoined statement is included:—"On slicing down the hemispheres and exposing the lateral ventricles, my attention," says Mr. Dunn, "was instantly arrested by the large size of the thalamus opticus on the left side: it was more than twice its normal size, and the contrast was most striking between it and the adjoining corpus striatum, and with its fellow on the opposite side. . . . A vertical section through

its substance showed that its size was owing to the presence of a tumour in its interior."

Dr. Marshall Hall has recorded a case which may have some possible bearing upon the view which I have proposed. "In a gentleman several epileptic seizures occurred, *the effect of fear—the fear of cholera.* After each, a hemiplegic paralysis of the right side took place; but this yielded completely, except that the patient could never divert his mind from the idea that the feeling of the affected side was somewhat different from that of the other. At length, a further attack proved fatal; and, on a *post-mortem* examination, the arachnoid was found slightly opaque, the ventricles containing serum, whilst *in the left corpus striatum there was the remnant of a small clot of blood in a cyst slightly discoloured.* The arachnoid was raised in one part by serum, resembling a vesicle, and a small vesicle was attached to the plexus choroides."*

Certain nations are characterized more than others by the intensity and vivacity of the emotional sensibility; the Irish differ largely from the Scotch, the French from the Spanish. Women

* *Synopsis of Cerebral and Spinal Seizures*, p. 61.

are, in this respect more remarkable than men. It might tend to elucidate this question, probably, to compare the relative development, in the respective instances, of the ganglia presumed to be connected with the functions in question.

• Emotional sensibility produces its own reactions upon the general system, distinct from the movements which Dr. Carpenter denominates consensual. Its expression through the eye and the vascular system, indeed, is familiar to experience. When this sensibility is slightly acted upon, there ensues a mere feeling that leads to no external or visible result; the effect remains a simple fact of consciousness. When it is influenced, however, in a higher degree, there arises an impulse to action, whether for the mitigation of some pain or for the attainment of some pleasure; but, apart from all resultant voluntary action, the effect upon the system, and particularly upon certain muscles, is rendered sufficiently obvious. Physiognomical expression, as it is called, indicates to some extent the degree and the kind of emotion which is felt. The diagnosis and the prognosis of mental maladies, and, in a less degree, of other more physical ailments, are greatly aided by attention to this circumstance.

In ordinary life, we constantly witness the influence which is exercised upon the physical frame by the emotional sensibility. A cheerful countenance, with a light, elastic step, denotes its lively and grateful state; whilst an opposite condition is evinced by the sorrowing, anxious aspect, with heavy tread and measured gait. These phenomena may, and commonly do, show themselves without participation of the will, or of any of the forms of sensation—a fact which certain morbid states amply demonstrate. Muscles entirely withdrawn from the influence of volition and of all sensational impressions, as in some cases of facial paralysis, will frequently, as in laughter and paroxysmal weeping, exhibit activity under the influence of emotion.

The independence of sensation which emotional reactions at times display, is well exemplified in the account which I subjoin; premising, however, that probably the *emissio seminis* constitutes the most striking and conspicuous phenomenon ordinarily arising in immediate response to common sensation. A gentleman some years ago consulted me, in good general health and in the meridian of life, in consequence of erectile incapability and absence of the allied local sen-

sation; yet he had experienced *ejaculatio* under the pure influence of emotion, provoked by an experimental attempt at *coitus*.

The foregoing facts, anatomical, physiological, and pathological, certainly constitute no insignificant support to the hypothesis which I have advanced concerning the fundamental distinctness of *sensational* and *emotional* sensibility, and do not, I think, leave the view which I have propounded a purely speculative one,—that these different sensibilities have respectively separate ganglionic centres in the encephalon.

CHAPTER V.

THE INTELLIGENCE, AND ITS ORGANIC REGION.

A FORM of consciousness, which is higher still in the psychical scale than either sensation or emotion—THOUGHT—is also, in the present sphere of existence, dependent upon organization. Impressions received in the sensory and emotive ganglia influence thinking, and are in some sense essential to it; but thought itself is something beyond. Such impressions constitute the rude material of *ideas*, which, arising out of the apprehension of objects and states of existence, constitute the basis of all positive knowledge; and which, once existent in the consciousness, can be recalled in memory, and thus be rendered available in all the operations of mind.

It is physiologically certain that the Intelligence, alike in the estimate of things, qualities, and circumstances, and in the combination and arrangement of ideas, as in imagination and in reasoning, has cerebral instrumentality for its

exercise; and evidence from all sources, anatomical, physiological, and pathological, points to the cortical gray matter of the brain—the vesicular neurine investing the convolutions—as supplying the requisite organic conditions.* Mr. Solly has very appropriately designated this structure the Hemispherical Ganglia.

The progress of an impression from sensation, through intuition and representation, up to thought, has supplied to psychologists the occasion of much interesting and ingenious speculation; but, for physiological ends, we need not attempt any very detailed analysis of this operation. For the present purpose it may be sufficient to cite the fundamental distinction, universally experienced and acknowledged, between *thought* and *feeling*, *intellect* and *sensibility*, *intelligence* and *emotion*. Poets, dramatists, and philosophers, alike in their disquisitions and their illustrations, always recognise this obvious divisibility of the facts of consciousness. Much of the phraseology of common life, moreover rests upon such a duality in our inward expe-

* As the class of facts presumed to establish the function of the hemispherical ganglia is cited in foregoing pages, the evidence is not again adduced in the present chapter.

rience. In correspondence therewith, anatomical and physiological facts suggest a seat of thought distinct from that of feeling; the separate regions having between them a white central mass.

"What thin partitions sense from thought divide."*

White matter, then, intervenes between the vesicular neurine forming the sensory and emotive ganglia, and that which forms the convoluted surface of the cerebrum; and impressions received in the former may be regarded as extending their influence along the fibres of the central mass, until the gray summit is attained, when changes are induced in that region which minister to the intelligence. Intuition of some existence—a perception—thus arises, and sensational ideas are in this way primarily obtained. If we reflect upon the processes that go on within the mind, we shall see that neither a sensation nor an emotion necessarily involves an idea, and that an essential difference exists between such passive subjective states and an intellectual appreciation of their objective significance. How often, for example, do we find that, notwithstanding the full consciousness of a sensation,

the idea suggested by it does not arise until some seconds or even minutes have elapsed? The utterance of certain words, as sounds, is heard; their signification does not, at the moment, strike the hearer; and yet in a short time, without any external cause, and without any effort of attention, the meaning will sometimes break upon the intelligence.

Sensational ideas, so called, originate in the perception of physical objects, whilst *abstract* ideas, as they are denominated, spring from contemplation of the qualities and relations of things; but whether ideas be abstract or sensational, they seem by a sort of mental illusion to have, as it were, an objective existence in themselves, when intimately and closely regarded. "Once formed," says M. Delasiauve, "they must be considered as having an existence of their own, independent of their source. But, if so, and being recovered after disappearance, what store-house conceals them?"* We cannot tell; but we may investigate, with some success, the mode and the conditions of their formation and reproduction. If ideas obtained primarily in some past time return

* *Annales Medico-Psychologiques*. Juillet, 1856.

to the consciousness, the result is *Memory*; this may occur with or without voluntary effort; in the former case it is sometimes distinguished as *Recollection*, and in the latter as *Reminiscence*. When varied ideas develop themselves, constituting a certain unity in definite forms of thought, we have *Conception*. That irregular and spontaneous evolution of thought which obtains so habitually in the absence alike of external excitant and of voluntary effort, we may designate *Imagination*. A fixation of thought by the will constitutes *Attention*. *Comparison* and *Judgment* are operations in which the Mind determines the resemblances and the relations amongst its ideas, conformably to realities which they represent either within itself or in the world without. Now although Dr. Carpenter, more, probably, than any other physiologist, has collected a mass of evidence in support of the view which assigns to the hemispherical ganglia the organic instrumentality of all psychical processes which involve ideas, he has not, in the absence of facts, attempted to show that particular divisions organically subserve distinct intellectual faculties. And indeed in the failure of phrenology, there would appear to be no satisfac-

tory foundation upon which even a plausible speculation of the kind can rest. Certainly, cranioscopic facts would suggest that the anterior division of the cerebrum has some special connexion with that fertility and orderly regulation of thought which constitutes intellect *par excellence*. The same kind of evidence, moreover, would render it probable that the upper region of the hemispheres is, in some way or another, associated with the development of ideas which tend to give what is understood by moral elevation of character; as also that the posterior division has some similar connexion with affections and propensities common, for the most part, to man and animals.

CHAPTER VI.

THE SEAT OF CONSCIOUSNESS.

DR. CARPENTER regards the special seat of all Conscious activity to be the Sensory Ganglia at large; and thus he holds that, although the hemispherical ganglia *minister* to the intelligence as its organic region, THOUGHT has no actual existence until correlated physiological changes arise in the Sensorium.* He maintains this position, it is only fair to say, by very close and ingenious arguments,

* Dr. Carpenter's views are thus stated by himself in the latest edition of his *Human Physiology*:—"The cerebrum is the instrument of all those *psychical* operations which we include under the general term *intellectual*. . . . It does not hence follow, however, that the cerebrum has such a direct relation to the mind that the consciousness is immediately and necessarily affected by changes taking place in its own substance; and, however startling the proposition may at first sight appear, that the organ of the intellectual operations is not itself endowed with consciousness, a careful consideration of the relations of the cerebrum to the sensory ganglia will tend to show that there is no *à priori* absurdity in such a notion. For, if the connexion of the vesicular matter of the cerebral hemispheres with the sensorial centres

which, however, to myself seem neither to be conclusive nor satisfactory. They would appear to resolve themselves into the following propositions:—

As the same anatomical connexion subsists between the hemispherical ganglia and ganglia situated lower down in the encephalon, as between the retina and other such peripheral nervous expansions, and vesicular neurine located more internally, wherein the sensational consciousness is considered exclusively to dwell; so it is probable that a functional analogy exists between the hemispherical ganglia ministering to ideas, and structures like the retina ministering to sense,—the proper consciousness only being awakened

be anatomically the same as that which exists between these centres and the retina, or any other peripheral expansion of vesicular matter in an organ of sense, which we have seen that it is, and if the same kind of change may be excited in the sensorial centres by an impression from each source, which has been shown to be a matter of common occurrence,—it can scarcely be deemed unlikely that the sensorial centres should be the seat of consciousness, not merely for the impressions transmitted to them by the nerves of the external senses, but also for the impressions brought to them by the nerves of the internal senses, as the sagacious Reil designated the radiating fibres of the cerebral hemispheres.”—
p. 545.

under circumstances of physiological activity of the connected ganglia situated more internally. Next, it is antecedently probable that there is a single centre of consciousness somewhere; and this being so, that the sensory ganglia should be admitted as that centre. And lastly, certain phenomena of common observation seem to prove that an elaboration and perfection of thought may take place without any consciousness thereof, excepting in the results; a process which goes on most probably in the hemispherical ganglia, and which may be designated Unconscious Cerebration.

Now, before examination of these views, it may be well to define clearly that which most physiological psychologists mean by some of the phraseology which they employ. When mention is made of consciousness residing in this or in that structure, it is not intended to signify that the vesicular neurine either thinks or feels. What is meant is simply this—that physiological action occurring in particular ganglia is the direct correlate, the organic condition, of some corresponding form of thought or feeling; that, for example, particular states of the olfactory ganglia have systematic association with the sensible consciousness of odour, and so of the optic and

other ganglia, up to the hemispherical. And thus when any of the encephalic ganglia are spoken of or described as the region of sense, emotion, or thought, it is only meant that functional activity of the structures in question is correlative with corresponding forms of consciousness in the proper *Me*-ity. But in detailed exposition, or in the philosophical discussion of psychological physiology, it is convenient that phraseology and methods of expression be made available, which, without explanation, might receive an interpretation contrary to the intentions of those who employ them. We will return, however, to Dr. Carpenter's reasoning.

It will be conceded that, in our various speculations regarding the physiology of nerve-substance, the function we assign to particular structures should at least be conceivable, definite, and antecedently probable. For the illustration of my argument, I will cite the circumstances and the conditions of the visual apparatus and its offices. Now, if we reflect upon the share which, physiologically, the retina and the optic ganglia have respectively in the production of sight, we shall perceive, I apprehend, that there is no conceivable analogy between the peripheral expan-

sion of nerves of sensation and the hemispherical ganglia as ministering to the intellectual consciousness. It may be admitted that the retina constitutes the seat of no conscious function; and yet it may be that it has a very definite, intelligible, and even necessary office. The sensible "intuition of external objects demands, from the very nature of the case, a peripheral structure physically subservient to the more internal organization, because the impressions to be conveyed by the conducting nerve must have a surface whereupon to be received, and that, too, as the necessary antecedent to a corresponding change in the appropriate ganglion within the encephalon; and the retina is obviously fitted for the receipt of such impressions—an office which, apart from its demonstrability, is conceivable, definite, and antecedently probable.

But when we come to the origin of ideas, and their manifold relations one with another, what imaginable antecedent can there be to the thought excepting some sensational phenomenon? In the genesis of simple ideas, we must certainly admit a preliminary physical impression—one, however, which acts upon the organs of sense, and gives birth to a conscious feeling, receiving definitiveness

and distinctiveness only in development of the intelligence. Now, what conceivable process of a psychical character should *intervene* between the state of sensation and the springing up of an idea? In the suggested analogy afforded by the office of the retina, the purely physical change coming between the presentation of an object and the sensational consciousness provoked by it, is not only conceivable, but demonstrable; a change which is brought about in a manner virtually similar to that which obtains in photography.

That material changes take place in the hemispherical ganglia *coincidentally with* thought, is in the highest degree probable; but should not such material changes be regarded rather as the physical correlate of the psychical process, than as an intellectual function, going on without consciousness?

Dr. Carpenter observes, "There is an *à priori* improbability that there should be two seats of consciousness so far removed from one another as the sensory ganglia and the vesicular neurine of the hemispheres."* But the ganglia of the external senses are separate and distinct, and are

* *Human Physiology*. Fifth edition. p. 545.

just as remote one from another—the olfactory from the auditory, for example. Still, it will not be denied that these ganglia are separately the seats of a proper sensational consciousness. But Dr. Carpenter would seem to limit his view concerning the oneness of a seat of consciousness, to sensations and ideas having similitude of nature, thus:—"If we admit," says he, "that the sensory ganglia are the seat of the original sensation, we can scarcely but admit that they are also the seat of that which is reproduced by the cerebral act,"* referring to the phenomena of *remembered sensations*. I would submit, however, that the memory of a sensation which involves the idea, constitutes a form of consciousness, different from sensation itself, and that this latter is *not* that which the cerebral act reproduces when sensory impressions are remembered. A cerebral act appears to reproduce a sensation in certain cases of *hallucination*, when it ensues upon the vividness or pertinacity of an idea, as if from some inverted nervous action—a sort of playing back of the cerebral influence upon the ganglia of external sensation; but this is a very differen

'thing, from the remembrance of a sensory impression. Indeed, if the argument from a supposed necessity of a single seat of consciousness were pushed to its legitimate consequences, should we not go beyond Descartes even, and contend, not simply for some such structure as the pineal gland—not for the whole even of a single cell belonging to some ganglionic aggregate—but for a mathematical point?

I now proceed to consider the particular doctrine of Unconscious Cerebration. "We seem justified," says Dr. Carpenter, "in affirming that the cerebrum may act upon impressions transmitted to it, and may elaborate results such as we might have attained by the purposive direction of our minds to the subject, *without any consciousness* on our parts; so that we only become aware of the operation which has taken place when we compare the result, as it presents itself to our minds after it has been attained, with the materials submitted to the process."*

The facts cited in support of the above statement are more or less within the well-recognised experience of us all. There is the spontaneous

* *Human Physiology*. Fifth edition. p. 545.

reproduction of an idea, voluntarily and design-
edly sought for in vain; there is the rapid and
seemingly unconscious performance of certain
acts after the institution of *habit*, although de-
pendent originally upon conscious states; and
lastly, and more decidedly, may be noted the
entirely new development which a subject is
frequently found to have undergone when, after
having for some time ceased to think of it, we
come to it anew—"a development," says Dr.
Carpenter, "which cannot be reasonably ex-
plained in any other mode than by attributing it
to the intermediate activity of the cerebrum,
which has, in this instance, automatically evolved
the result without our consciousness."*

It will be conceded that if an explanation of
such phenomena as the above can be given that
is accordant with recognised laws of thought, it
must be accepted rather than one that involves a
more occult agency. "*Leges philosophandi vetant
plures causas fingere aut quærere quam quæ ad
rem explicandam sufficient.*" Now, I conceive
that the particular facts which seem to countenance
the theory of unconscious cerebration, will

certainly admit of some more obvious and simple interpretation than one which renders it necessary to regard nerve-substance as elaborating and perfecting thought *without thought*; a process, it appears to myself, which would be not altogether unlike the production of melody by a notoriously unmusical instrument without the sensible manifestation of sounds.

I would here propose to the reader's attention a fundamental consideration bearing upon this question, which is, that the human consciousness, apart from other analyses of which it is susceptible, is traceable under the two forms of *direct* and *reflex*. In the former case, ideas are in some sense automatic, and for the most part transient; in the latter, they are in their origin to some extent voluntary; or, springing up spontaneously, they become designedly retained in the consciousness, and constitute the material, so to speak, of an objective regard. In solitary musing, when there is no intentioned application of mind to any subject, but rather a passive contentment in our emotional states, consciousness is mostly of the direct character; and, under such circumstances, thoughts and feelings evolve themselves involuntarily—without any sort of effort or purpose.

From time to time, however, these mental products are arrested by a reflex act; and the mind voluntarily turns in upon its own thoughts and feelings, thus contemplating not only that which it knows and feels, but its very self at the same time as knowing and feeling.

Now, although we ordinarily remember facts and mental processes very much in proportion as they have engaged the attention and a certain reflex consideration at any time, this rule is by no means absolute. Ideas and feelings once experienced may at any time revive in the consciousness, and yet not always be recognised as having previously had existence; particularly when at former periods they have never been subjected, by attention, to a reflex mental process. Undoubtedly, under these latter circumstances, numberless thoughts, and reasonings, and ideas of external occurrences, pass for ever from the consciousness; but this is far from being always the case; again and again will they return, without any systematic identification. And are not most of the phenomena cited by Dr. Carpenter in support of his theory of unconscious cerebration explicable by these laws of spontaneous thought, according to which our mental

operations are frequently unremembered when repeated. "Of the thoughts which occur to us suddenly, and which seem to us purely spontaneous, not a few are reminiscences, more or less faithful, of what we have before read, heard, or thought; and consequently they proceed from a preparatory fact which we do not remember."*

And yet this recovered thinking, when attentively regarded, will sometimes seem to have the lucidity and perfection of a special revelation, and may well seem as though it were the product of some unconscious operation of the mental organ. Still, by careful consideration and examination, we shall at times procure demonstration of the contrary. In composition, we frequently hit upon an idea, or a word, or the turn of a phrase; it strikes us as a happy thought, and appears to be the spontaneous evolution of our own minds. We afterwards discover, possibly by an accident, that we had heard or read it, yet we had forgotten all about it, and had believed it to be our own. And can we doubt that, in the same way, we sometimes recall our past thinking,

* *Fundamental Philosophy.* By Balmez. American translation from the original Spanish, by Brownson. A very profound and interesting work.

deeming it to be new, because we have no conscious remembrance of it? Through ignorance of these laws of thought, or inattention to them, unjust accusations of plagiarism are sometimes made; but "a writer is not a plagiarist, although he makes ideas his own which have originated with others." But it is often true that man imagines he creates, when he only recollects."*

In more particular illustration of these phenomena, it may be noted that a book shall be read, and soon laid aside; the reader may then pass on to something else, and in a very brief period be unable to render any very clear account of what he has read. Some months afterwards, when the subject of the work becomes a topic of conversation, he is probably surprised that he has derived considerable information from it. How do we explain facts of this kind? Why, in many of such cases, the person situated as supposed in this illustration will discover, upon attentive self-examination, that in his passive musings the contents of the book had been in his spontaneous thoughts; and that, under such circumstances, an acquaintance with its subject had been gradually,

* Balmez. *Op. citat.*

but still consciously, perfected. This mental process may probably be with some accuracy designated *involuntary and inattentive thinking*, but not with justice an *unconscious action of the brain*. I am decidedly of opinion myself that the explanation now offered of these well-known phenomena will more or less cover all the psychical processes that have been cited to establish a doctrine of Unconscious Cerebration.

But in whatever way this topic may be rightly elucidated, the particular mental operation is a very ordinary fact of experience. Indeed, most of our habitual actions may have some place in this category of *consciousness without attention or will*; and yet, though adverted to by several authors as unconscious processes, they will admit, I think, of another and a more just interpretation, when closely investigated. "There are various internal operations," says Lord Kames, "of which we have no consciousness; and yet that they have existed is made known by their effects. Often have I gone to bed with a confused notion of what I was studying, and have awaked in the morning completely master of the subject."*

* *Sketches of the History of Man*. By Henry Home, of Kames. Edit. 1807. Vol. iii. pp. 105, 106.

This is a circumstance of a kind occurring to most persons at some time or another, and one which receives its explanation, I conceive, in the renewed vigour of mind procured by a night's sleep, whereby the facts already in the mind have their relations and correspondences more clearly and accurately recognised than was practicable during the previous evening's fatigue; just as a problem which is a source of perplexity and vexation after a luxurious dinner, is readily soluble and a subject of interest after tea.

The same writer alludes also to the automatic character of many of our acts, primarily accomplished, but afterwards initiated only, by a voluntary effort. "Some effects," says he, "require a train of actions: walking, reading, singing. When these actions are uniform, as in walking, or nearly so, as in playing on a musical instrument, an act of will is only necessary at the commencement; the train proceeds by habit, without any new act of the will."*

There is a still more remarkable enunciation of a doctrine of unconscious mental action made by Rosmini, a celebrated Italian psychologist,

* *Ibid.*

who observes, in the following passage from his writings:—"A close attention to our internal operations, along with induction, gives us this result, that we even exercise ratiocination, of which we have no consciousness; and, generally, it furnishes us with this marvellous law, that every operation whatsoever of our mind is unknown to itself, until a second operation (reflection) reveals it to us."* But the single word *reflection*, introduced by this author parenthetically, would suggest that the explanation of this law was not, to his own mind, very different from that just offered in these pages.

Reverting to the more general proposition, that the sensory ganglia constitute the exclusive region of consciousness, I would ask, does not a fundamental vice attach to the whole argument in its favour? Whatever may be said regarding ideas that rest for their support upon sensible

* "L'osservazione più attenta posta sulle nostre interne operazioni unita all' induzione ci dà questo risultamento, che noi facciamo de' raziocinii di cui noi abbiamo coscienza alcuna, e in universale ci somministra quella legge maravigliosa che 'ogni qualsiasi operazione dello spirito nostro é incognita à se stessa ed ha bisogno d'un'altra operazione (riflessione) che ce la riveli."—*Psicologia*, vol. i. p. 196.

forms, *Intelligence*, in most of its phases, cannot surely be deemed to be the simple reproduction of impressions received through the senses. However plausible may be the reasons by which it is contended that purely representative thought consists of *transformed sensations*, according to Condillac's theory, there can be no corresponding argument sustaining a like theory with reference to the higher manifestations of mind, including its more general and abstract operations. It has been seen that the representative sensible faculty primarily develops ideas, by the presence of an object acting upon the organs of sense ; and that these ideas will afterwards spring up independent of the object, either spontaneously or by some operation of the will. Still even here, as I have already maintained, the idea upon close attention is distinguishable from the sensation itself. And, however anxious we may be to reduce every idea to some internal form of a representative character, we shall find in the depths of our consciousness numerous thoughts which can have no proper basis in sensible images. What is that faculty of thinking which seizes upon analogies, which traces the relations of metaphysical ideas, which estimates the possible? Do not the ideas

of unity, number, time, space, and causality express things which are not sensible? "We may ask those," says Balmez, "who hold that every idea is the image of an object, what sort of an image the idea of *not being* would form?"* And yet this sensational theory is an inevitable postulate in the argument, which limits the seat of consciousness to the sensory ganglia; an argument which practically nullifies all psychical function in the admitted organ of the intelligence.

But whatever defect or incompleteness may characterize the development which Dr. Carpenter has given to his own doctrine when localising consciousness, the merit and originality of that physiologist in systematically establishing, by extensive and careful induction, a division of the encephalon into hemispheres and sensory ganglia correlative with the psychological distinctions of thought and feeling, cannot, I believe, be disputed. The scientific justice of this division may be further corroborated by a class of facts hitherto not stated, which, however, I shall briefly cite in completion of the present chapter.

It is well known that extensive disease will

sometimes interfere with the normal condition of the hemispherical structures without fatal results, and occasionally even without seriously affecting the general health; displacement of the convolutions from chronic hydrocephalus, softening of their substance, carcinomatous degeneration, laceration, and even abstraction of some portion by external violence, have severally been discovered; and, yet, up to a period immediately preceding death, without consequent derangement of the bodily functions to any remarkable extent. When, however, the slightest lesion happens to the ganglionic tissues underlying the hemispheres, serious results very speedily exhibit themselves: convulsions, paralysis, apoplexy and death will not unfrequently arise in such circumstances. This relative liability to ulterior physical mischief consequent upon damage done to the hemispherical and sensory ganglia respectively, very much corresponds with the comparative deterioration resulting from excessive thought and overwrought feeling. Studious habits, however continuous, in themselves operate with but little prejudice to the system; when the health of severe students gives way, the fact is almost always directly traceable to irregularity of meals, in-

adequate sleep, neglect of out-door exercise, and deprivation of suitable recreation; let these be duly attended to, and scarcely any amount of pure thinking will act injuriously upon the system, or diminish the prospects of longevity. The case, however, is very different when, from any cause, feeling is greatly perturbed, when the emotional sensibility is habitually excited; then, more or less, the health constantly suffers; organic changes, not unfrequently malignant, are induced; and sometimes life is prematurely and abruptly extinguished. See the perpetually occurring effects of grief, anxiety, and corroding care—the wan countenance, the sickly and dingy complexion, the wasted flesh. Look even at the results of too much joyous excitement—the sleepless nights, the nervous excitability, the fever-flush. We have none of these phenomena exhibited by the merely studious man; by him at least who is exempt from striving, competitive anxiety, from ambitious struggles, and other influences that deteriorate *feeling*. You will rather notice a flourishing state of both mental and bodily health. Longevity, too, notoriously attaches to philosophers and men of science, if they only take ordinary care of themselves, and do not engage

too vehemently in the *battle* of life, which compromises the sensibility. When we hear or read of the *calm* philosopher and the *unimpassioned* sage, we picture to ourselves immediately an *old* man,

“—— in whose years are seen

A youthful vigour and autumnal green.”

•CHAPTER VII. •

THE PHYSIOLOGICAL POTENCY OF IDEAS.

THE presumed action and reaction among the several ganglionic centres have supplied to physiologists abundant occasion for curious and ingenious speculation. Dr. Laycock, now the Professor of Medicine in the University of Edinburgh, published some years ago, in the *British and Foreign Medical Review*, a very interesting memoir "On the Reflex Functions of the Brain," in which the author proposes a doctrine of unconscious cerebration (without using the phraseology), differing from that of Dr. Carpenter in the circumstance, that it regards the unconscious reflex agency, generally attributed by modern physiologists to the spinal cord exclusively, as the supplementary attribute of the ganglionic centres at large, including the hemispherical. And thus he holds that reactions upon the muscles and other portions of the organism may take place from cerebral changes that happen

without consciousness, changes which he denominates *ideagenous* (apt to beget ideas), and *kinetic* (productive of movement). This hypothesis would seem to involve the notion that physical alterations usually pervading the cerebrum in correlation with thought, sometimes take place without thought, producing in their occurrence motor and other phenomena of the same outward character as when ideas are concerned in such alterations. These views may be illustrated by an example, which Dr. Laycock conceives to be afforded by the circumstances of the hydrophobic gasp brought on by attempts to drink. "The cerebral nerves," says he, "being analogous to the posterior spinal nerves, and the encephalic ganglia analogous to the spinal ganglia, the spectrum of the cup of water will traverse the optic nerves, and enter the analogue of the posterior gray matter in the brain, causing changes (*ideagenous* changes) corresponding to the idea of water; thence the series of excited changes will pass over to the analogue of the anterior gray matter, exciting another series (*kinetic* changes), by which the necessary groups of muscles are combined in action."

To these views of Professor Laycock there

would appear to be this objection, that it is not very obvious how the evidence of facts can be made to corroborate them, or otherwise. And, moreover, they would seem to involve an anomaly in physiology, by ignoring or practically denying all specialty of function in the spinal cord, in opposition to that presumed law in neurology which affirms that particular ganglionic masses have separate and distinct functions. But whether movements of unconscious origin, and yet of an adaptive character, may or may not result from cerebral as well as from spinal action, it is certain that numerous psychical phenomena are observable, of a quasi-automatic character, from the dominance of particular ideas or trains of thought; phenomena resulting very often, irrespectively of what can rightly be called volition, and without any leading influence either of a sensational or emotional nature. In such circumstances, it may probably be correct to regard them as the product of some sort of reflex action of the hemispherical ganglia.

Dr. Carpenter has thrown much interesting light upon this subject, in the examination which he has bestowed upon the facts of somnambulism and other such peculiar states of the nervous sys-

tem, especially as exhibited when they are provoked by artificial processes. In the so-called mesmeric condition, and, indeed, in various kinds of irregular sleep, the effects are very noticeable, because in such states there is an accumulation or concentration of nervous energy in particular ganglia, producing results which exhibit function in forms very much intensified. In the ordinary transition state between sleeping and waking, there is often great fertility of the imagination, giving rise to disorderly groups of ideas, which react very distinctly upon the organism without governance from the will; muscular movement and other phenomena frequently showing themselves, in consequence of some dominant thought. An imaginary object of an attractive character presents itself to the consciousness; a snatch at it is made by the half-sleeper. Such an act cannot be regarded as voluntary, there is no selection among motives—no will; the movement is purely impulsive, originating in the idea.

But it is in those curious conditions of the system induced by the processes called mesmeric, that the most striking examples are witnessed of the potency of particular ideas. In some of these states the mind can at times be literally *played*

upon (to use Dr. Carpenter's expression), so as to reduce movements and actions contrived beforehand; these being suggested by communication of the correspondent thought, which the outward conduct is made to reflect. Mr. Braid of Manchester was probably the first to exhibit these results in a decisive and systematic manner. This gentleman, in the demonstrations which he denominates *hypnotic*, tells the sleeper or the sleep-waker, that he must raise from the floor some article at his feet; that, however, its weight may defeat him. The subject of the experiment becomes dominated by the idea that some very ponderous substance has to be elevated; a mistake, for it is probably a light pocket-handkerchief. In such circumstances, I have seen muscular effort exercised in vain. The converse of this experiment is shown by Mr. Braid. A heavy weight, raised with difficulty by an individual in his normal state, is swung with the little finger by the same person hypnotised, when governed by the suggested idea that he has to deal with a light substance. Again, it is intimated in the hearing of the subject of experiment, that he has been insulted; at once the proper sensibility is roused by the thought, and the head becomes elevated

in disdain. It is whispered that you are about to excite his benevolence, and he shows himself liberal in gifts. A variety of unwonted and as if automatic movements, Mr. Braid brings out by variation of the modes of suggestion. Dr. Carpenter has witnessed and attested the validity of these experiments. In the later editions of his *Human Physiology* he has worked out the whole subject very thoroughly, and has expressively designated the muscular actions in question *ideo-motor*. Ideo-dynamic is the term which I have myself suggested, as applicable to a wider range of phenomena—a term which Mr. Braid has himself adopted.

I would here note that it is reasonable to think that the immediate cause of all motor activity which is attended with consciousness, resides in some appropriate state of the emotional or sensational centres, even when the dynamic influence primarily issues from the hemispherical ganglia; ideas producing, by a downward action, that change in the sensorium which automatically accomplishes a result, correspondent with the thought which in this way receives its outward expression. “The power of the cerebrum,” says Dr. Carpenter, “to call forth muscular movements

is entirely exerted through the intermediation of the cranio-spinal axis upon which it is superimposed, no motor fibres directly issuing from the cerebrum itself."* In executing the most complicated movements, we take no heed, nor have necessarily any knowledge, of the individual muscles which the processes require; the then present idea, the train of thought, or the purpose, affects the emotional sensibility in an adaptive manner, and the correlative muscular phenomena manifest themselves. "Whoever," says Rosmini, "attentively considers the subject, perceives that the mandate of the will which moves any member of the body does not communicate the movement otherwise than by the intervention of some feeling."† Even in acts the most entirely volitional, the preceding *resolve* and the *confident expectation* of its realization are in some sense emotions; a fact which may be overlooked, in consequence of the intimate alliance between the initiatory thought and the resultant feeling.

* *Human Physiology*. Fifth edition. p. 652.

† "Chi più attentamente considera rileva, che l'impero della volontà che muove un membro del corpo non comunica il movimento senza intervento di alcun sentimento."—*Op. citat.*, vol. i. p. 172.

There are instances of another character than those already cited, in which peculiar ideas and trains of thought exert a dynamic influence upon the organism, under circumstances and with results of a very surprising nature; instances in which an effect is produced obviously upon the emotional sensibility in the first place, and then through this latter upon particular corporeal functions.

A gentleman some years ago consulted me for sleepless nights. I formed the opinion that the ailment was largely attributable to derangement of the stomach, and prescribed for him some bitter with an antacid. I thought it advisable, however, to commence with a free action of the bowels; and, with this view, prescribed also eight grains of the compound extract of colocynth and two of calomel, made into pills and directed to be taken at bed-time. When I again saw the patient, he told me the pills had given him an excellent night, for that he had slept beautifully! "But," I said, "did they not purge you? They were intended to do so." "Why," he rejoined, "as I had consulted you for sleepless nights, and as the pills were to be taken at bed-time, I thought they were to make me sleep, and I did sleep; I was not purged at all."

Now, instances of imaginary medicines producing the expected effect are common enough; doubtless this is a circumstance to be considered in estimating the follies of homœopathy and other such delusions of the hour; but here was a case in which, further, the ordinary action of powerful medicines was hindered by the dominance of an expectant idea.

The following case, having a like significance, is quoted from Pechlin, by Dr. Crichton, in his work on *Mental Derangement*, published more than half a century ago:—"There was a student of my acquaintance at Leyden, who, either because I was too young, or because he wished to save his money, did not consult me, but took care of his own health. He had probably heard medical men say that purgatives were the best kind of medicines, and that pills were the best form for giving them. As he had been told that Fernelius was an author of great reputation, he borrowed him of me. I sent it to him. He looked in the index for the word pill; and, as he imagined that all pills were purges, he took the first as the best. These were the *Pil. cynoglossi*; the dose ʒj, which he swallowed; and, after drinking two or three glasses of warm beer,

waited the effect; and, lo! it took place agreeably to the imagination, and he was thus purged by opium, hyoscyamus, crocus, and other anodynes and astringents.”*

The influence, under some circumstances, of particular directions of thought in determining convulsive action, is familiar to all practitioners who see much of hysterical and other such affections. On this account, detailed examples in illustration would be superfluous. “The effect,” says Romberg, “of the imagination on seeing spasmodic movements, and even the mere recollection of them, may give rise to convulsions.”†

It is interesting to witness the absorbing effects of dominant ideas in several of the forms of insanity. Common sensation sometimes appears to be temporarily abolished. At this time I have a female patient under my care, who, when deeply engrossed in her maniacal wanderings, seems quite insensible to pain. She will inflict upon herself bodily injury, as if from pure caprice, and display the most senseless indifference. “I have applied,” says Esquirol; “blisters, setons, moxas,

* *An Inquiry into the Nature and Origin of Mental Derangement*, vol. ii. p. 445.

† *Op. citat.*, vol. i. p. 136.

the actual cautery, to individuals strongly inclined to suicide, and to other melancholic patients, for the purpose of trying their sensibility. I have produced no pain; and some, after recovery, have assured me that they experienced no suffering whatever from these applications.”*

The phenomena of mesmeric and spontaneous somnambulism exhibit in many instances a parallelism with this state of insensibility, originating frequently in dominant ideas. In idiots, with whom ideas under all circumstances have such little potency, these mesmeric effects cannot be produced. At any rate, Dr. Guggenbühl, distinguished by his successful labours in the improvement of cretins, has repeatedly tried to influence these wretched creatures mesmerically, but has never succeeded in throwing any of them into a state of sleep even; a fact of itself suggesting that many of the witnessed effects of mesmerism flow from the dynamism of ideas.

The sudden and energetic communication of some striking thought to the mind of another, exerts in some cases very singular effects,—suspending the power of individual muscles or sets

* *Des Maladies Mentales*. Paris, 1838. Tom. i. p. 601.

of muscles, and occasioning temporary abolition of consciousness. The Abbé Faria, celebrated in mesmeric history, is said to have put whole rows of persons into an unconscious state by the vigour and determination with which he bade them "sleep!"

A remarkable case is cited by Crichton* from the *Psychological Magazine*, a periodical publication of the last century; a case which shows the paralysing influence of expectant thought, communicated as *shock*. "In Kleische, a small village in Germany, belonging to Mr. O. T, a maid-servant of that gentleman's family was sent a short league from home to buy some meat; she executed her order correctly, and, as she was returning in the evening she thought she suddenly heard a great noise behind her, like the noise of many wagons. Upon turning round she observed a little gray man, not bigger than a child, who commanded her to go along with him. She did not, however, return any answer, but continued to walk on. The little figure accompanied her, and frequently urged her to go along with him. Upon reaching the outer gate of her master's residence,

* *Op. citat.*, vol. ii. p. 16.

she was met by the coachman, who asked her where she had been, to which she returned a very distinct answer. He did not remark the little man, but she still continued to do so. As she was passing the bridge, he summoned her for the last time, and upon her refusing to answer him, he told her, with a menacing look, that she should be four days blind and dumb; and, having said so, he disappeared. The girl hastened to her apartment, and threw herself on the bed, unable to open her eyes or to pronounce a word. She appeared to understand all that was said, but could not make any answer to the questions which were proposed to her, except by signs. Everything was tried for her recovery by the family with whom she lived, but in vain. She was incapable of swallowing the medicines which were ordered for her. At last, on the expiration of the fourth day, she arose in tolerably good health, and narrated what had happened to her."

This may or may not be a true story. And if we assume its fidelity and accuracy, the "little gray man" may or may not have been a delusion; but, whether fact or fancy, the *idea* of a threatening figure dominated the girl's mind, and its *potency* was shown in the curious result.

An anecdote, which illustrates the same psychological principle as that illustrated in the foregoing narrative, has been communicated to me by my friend Dr. Whitehead, in these terms:—"The following is an account of the incident which happened to my old friend, Mons. Boutibonne, and which I promised to give you in writing. Mons. Boutibonne, a man of literary attainments, a native of Paris, served in Napoleon's army, and was present at a number of engagements during the early part of the present century. At the battle of Wagram, which resulted in a treaty of peace with Austria, in November, 1809, Mons. Boutibonne was actively engaged during the whole of the fray, which lasted, if I rightly remember, from soon after mid-day until dark. The ranks around him had been terribly thinned by the enemy's shot, so that his position at sunset was nearly isolated; and while in the act of reloading his musket, he was shot down by a cannon-ball. The impression produced upon his mind was that the ball had passed from left to right, through his legs below the knees, separating them from his thighs, as he suddenly sank down, shortened, as he believed, to the extent of about a foot in measurement, the trunk of the body falling backwards on

the ground, and the senses being completely paralysed by the shock. In this posture he lay motionless during the remainder of the night, not daring to move a muscle, for fear of fatal consequences. He experienced no severe suffering; but this immunity from pain he attributed to the stunning effect produced upon the brain and nervous system. 'My wounded companions,' said he, 'lay groaning in agony on every side, but I uttered not a word, nor ventured to move, lest the torn vessels should be roused into action, and produce fatal hæmorrhage, for I had been made acquainted with the fact that the blood-vessels, wounded in this way, did not usually bleed profusely until reaction took place. At early dawn, on the following morning, I was aroused from a troubled slumber by one of the medical staff, who came round to succour the wounded. "What's the matter with you, my good fellow?" (*Qu'a-t-il, mon camarade?*) said he. "*Ah! touchez-moi doucement, je vous prie,*" I replied; "*un coup de canon m'a emporté les jambes.*" He proceeded at once to examine my legs and thighs, and giving me a good shake, with a *ris de joie*, he exclaimed, "*Faites-vous lever d'abord, vous n'avez rien de mal.*" Whereupon I

spring up in utter astonishment, and stood firmly on the legs which I believed had been lost to me for ever. I felt more thankful than I had ever done in the whole course of my life before. I had not a wound about me. I had indeed been shot down by an immense cannon-ball, but instead of passing through my legs, as I firmly believed it to have done, the ball had passed under my feet, and had ploughed away a cavity in the earth beneath, at least a foot in depth, into which my feet suddenly sank, giving me the idea that I had been thus shattered by the separation of my legs. *Voilà ce que se fait-il le pouvoir d'imagination.'*"

But not only will a certain suspension of consciousness, and a temporary abolition of energy in particular muscles have place, under the dynamic influence of ideas, but, moreover, in some cases in which there is paralysis of function, an attentive and expectant thought will lessen for a time the morbid incompetency. The same influence, as already exemplified, will notoriously operate upon the organic functions, and in certain instances even will excite, as if volitionally, the action of involuntary muscles. Romberg relates the case of a patient whose leg and foot

had become quite insensible, and in whom voluntary motion in those parts was all but abolished; he states, however, that even in the absence of all feeling, "the movement of the toes was facilitated by directing attention to them."*

There is much parallel experience. I have seen, as well as heard of, transient improvement in the hearing, when deaf persons have been subjected, in all faith and confidence, to mesmeric and other such unwonted processes of cure. Who can doubt that the improvement, such as it has been, has resulted altogether from the idea? And may not the same thing be affirmed of most of those ailments which seem to benefit under the influence of many forms of charlatanry? And should we not place in a like category those well-known cases in which local action is stimulated or depraved by the bestowal of excessive and anxious attention to particular organs or structures?

Several instances have been reported of the possession of a voluntary power over contractions of the iris. Professor Beer, of the University of

* *Op. citat.*, vol. i. p. 3.

Bonn, is stated to have such a faculty, being able, in the same light, to contract or dilate his pupil at will. "This change in the size of the pupil, however, he brings about only through certain ideas. When, for example, he thinks of a very dark space, the pupil dilates. When, on the contrary, he thinks of a very light place, the pupil contracts."*

In closing the present chapter, I would just glance at the potency of ideas, as evinced in their moral as well as in their quasi-physiological effects. In the common events of life, how largely are men governed by mere idea, apart from any proper exercise of the will. This is the case alike with communities as with individuals. Look what happens with nations, suddenly and intensely impressed with an idea—how it eventuates in energetic action; witness the moral commotions, giving distinctiveness and character to particular epochs! The whole history of the world testifies to grave and momentous occurrences thus originating. See how the idea of LIBERTY has shaken society to its foundations. Numerous persons in

* *British and Foreign Medico-Chirurgical Review*, Number for October, 1857.

periods of crisis, without either motives of interest or any very elevated spirit, have sacrificed worldly comforts of every kind, and even life itself, to this particular idea. The Crusades afford a memorable instance of the wonderful force of a great thought, when rendered dominant; so, in more modern times, do the remarkable events of the first French Revolution. In matters more individual, the favourite idea—the hobby—of particular persons, will notoriously influence conduct to an extent vastly disproportionate to its intrinsic importance. “Affections are strong,” says a periodical writer;* “but ideas are stronger. Through them Howard left his only child in a madhouse, while he carried on his benevolent reforms in the prisons of distant countries. They steeled Bernard Palissy to see unmoved his wife and children perishing, while he tore up the very boards of his cottage to feed the furnace for his experiments. They possessed the painter who stabbed his brother, that he might truly paint the throes of his death agony. They made Rousseau, who could take such pains to give the rules for his idea of education in *Emile*, leave

* In the *Rambler*, April, 1857.

described them for the most part as tendencies arising out of simple states of mind, constituting particular and distinct faculties. This proceeding has been exemplified in an earlier chapter. But let us examine this matter somewhat more closely. Love of Glory, Self-Esteem, Desire of Society, Sudden Resentment, Firmness, and so on, cannot be conceived in all their comprehensiveness, without the recognition of both an intellectual and a sentient element. And if we look at the question from another point of view, we shall see that Wishes, Desires, Resolutions, Aversions, and other such psychical dispositions, are *modes* in which intelligence and sensibility exercise reciprocal influence. Particular ideas or sets of ideas exert an agency upon the corporeal self-feeling, and accomplish peculiar changes therein; the emotion itself, so far as it is a mere feeling, being a certain physical perturbation—*cænæsthetic*. The sentient impressions thus received, react again upon corresponding trains of thought. Dr. Thomas Brown had some distinct appreciation of these two elements entering into the composition of an emotion. "Certain objects," says he, "are not merely *perceived* by us, as forms, colours, or sounds; the perception

of these forms, and colours, and sounds is followed by an emotion which is of various nature, according to the nature of the object.”*

Now if, as I have supposed, the misnamed optic thalami and the corpora striata constitute the ganglionic centres of the several kinds of emotional sensibility, we must, in these processes regard them as acted upon from above—from the region of intelligence, the hemispherical ganglia—through the medium of intercommunicating white fibres; just as in cænæsthetic phenomena dependent upon more physical states, the same centres are supposed to be acted upon from below, through nervous filaments distributed to the organs and structures very generally. This hypothesis, view, or doctrine, has called forth the following observations with regard to it from that distinguished psychologist and philosophical writer, Mr. Morell: “It would harmonize extremely well with the whole observed development of our knowledge, which, commencing with a physical impulse, appears next in the form of an incipient mental sensibility, and then expands into distinct notions or ideas, which ideas can then, in their turn, react

* *On the Philosophy of the Human Mind*, lect. li.

upon the emotions. The position of the above-mentioned ganglia at the base of the hemispheres corresponds exactly with the supposed function. They lie midway between the sensory ganglia on the one side, and the cerebral hemispheres on the other, and have fibres which communicate downwards to the one and upwards to the other.”*

It may be objected that the ganglia in question are not simple in their structure, but rather congeries of several ganglionic masses; and, therefore, that it is unlikely they should constitute the organic instruments of one function rather than of several functions. This objection might have weight, if all variety in the manifestations of emotional sensibility were in degree only; or if, in the last analysis, it was merely pleasure and pain, as very generally maintained by psychological writers; to which latter proposition I must demur.

The inward feelings called forth, as emotion, by the agency of thought, may, of course, be pleasurable or painful; but any account which represents the “Emotions” as merely the pleasure or the pain which accompanies certain intel-

* *Elements of Psychology*, p. 102.

lectual states, constitutes a very incomplete description. Yet the late Mr. James Mill, the Rev. Sydney Smith, and many others, would seem to reduce them to so very simple a character; although, in practical and extended discussion, other views become implied, in disregard of strict logical consistency. Benevolence, considered in this way, becomes the pleasure experienced in contemplation of the happiness of others, and the pain at witnessing their misery; and fear, again, as the pain that ensues upon the expectation of calamity; an analysis being thus attainable with all our emotional states—passions, affections, and sentiments alike.

Now, I think it will be conceded, upon reflection, that we must admit the specifically distinct character of our varying states of consciousness, as recognised in Hope, Fear, Grief, Pride, Vanity, Love, and other such inward experiences. "Sentiment," says Rosmini, "has various states, pleasurable and painful, with gradation and *variety* of pleasure, and with gradation and *variety* of pain."* And, somewhat more explicitly, in another place,

* "Il sentimento abbia varj stati piacevoli e dolorosi con una gradazione e varietà di piacere, e con una gradazione e varietà di dolore."—*Op. citat.*, vol. i., p. 240.

he observes:—"The sentiments correspond with orders of reflection; so that there are as many orders of feeling (pleasurable or painful) to be noted, as there are orders of reflection exercised by man, and the number of these is indefinite."*

It is quite certain that we *feel* in a characteristic manner under the varying circumstances of our intellectual states, quite irrespective of the pleasure or the pain which may accompany them. Fear is fear, and need not be exclusively pleasurable or painful; love is love, and is only pleasurable under suitable circumstances; grief sometimes is a "silent" luxury, though ordinarily a poignant suffering. Such psychical states as Love, Hatred, Desire, Aversion, Joy, Sadness, Hope, Despair, Fear, Audacity, Courage, and so on in limitless variation, are modifications, I submit, of the Emotional Sensibility, very generally provoked by thought, but still separable from thought; such modifications, moreover, being distinguishable amongst each other, re-

* "I sentimenti seguono gli *ordini della riflessione*, di modo che si possono distinguere tanti ordini di sentimenti (piacevoli o dolorosi) quanti sono gli ordini della riflessione che può far l'uomo, e il numero di questi ordini é indefinito."—*Op. citat.*, vol. i., p. 167.

garded simply as feeling. So little, indeed, does emotion consist of mere pleasure or mere pain, and so obviously does it include numerous and varied modes of feeling, that, as in the case of external sensation, several kinds of emotion may be present to the consciousness at the same time. "In our mental sequences," says Dr. Thomas Brown, "the one feeling which precedes and induces another feeling, does not, on that account, give place to it ;"* just as with the phenomena of outward sense, the superinduction of one sensation by another does not necessarily abolish the first.

My meaning, however, with respect to varieties of the emotional sensibility, will be somewhat plainer, if I cite still more particularly the analysis afforded by external sensation. Hot and cold, hard and soft, moist and dry, as sensations, are distinguishable conscious experiences, produced by the qualities of objects, but in themselves subjective states, pleasurable, painful, or neutral, as the case may be ; and so with other kinds of sensational experience. The sense of taste supplies, probably, the most complete and readily seized

* *Op. citat.*, lect. xl.

analogy to the sensibility which we denominate emotion. Thus, *sweetness* is commonly pleasurable; to some persons, however, it is painful; and to others, again, it is neither one nor the other. In some instances it is pleasurable, painful, and neutral, at different epochs of life; but at all times, and under all circumstances, sweetness is sweetness. In fine, gustatory, like emotional impressions, are sources of pleasure and pain; they have always, however, a very distinct character about them; and they would be but very imperfectly described in being designated the pleasure and the pain resulting from contact of the tongue and palate with sapid particles.

In a somewhat analogous manner, I maintain that emotion, experienced either as sentiment, affection, or passion, consists, in so far as it is a feeling, of varying conditions of that inward sensibility which I have described under the designation of cænæsthesis. Particular kinds of emotion, though usually determined by the presence of correlative ideas, may yet be conceived, and indeed be experienced, in their absence, or prior to them. For example, when a huge watch-dog loudly and unexpectedly barks, I start, from an *emotion* of fear, which distinctly

precedes the *idea* of danger—the feeling and the thought being quite separable. “Gratitude,” says Thomas Brown, “is distinguishable from the mere memory of kindness received.”*

In nervous and mental maladies, emotional states of every kind are frequently witnessed in the absence of correlative ideas. Hopefulness, joy, grief, and timidity, are perpetually encountered under these circumstances, often, indeed, initiating the particular ailments. “Some melancholic persons,” says Esquirol, “are frightened at everything, and their life is consumed in constantly recurring anguish; whilst others are terrified by a vague feeling which has no motive. ‘*I am afraid,*’ say these patients, ‘but of what *I don’t know; but I am afraid.*’”† It is within the experience of almost every one to have felt joy, sorrow, and anxiety, as the transient result of a terminated dream; the ideas connected with which have entirely passed from the mind. “*Cheerfulness,*” says Brown, “is that state which, in every one, remains for some time after any event of unexpected happiness—though the event itself may not be present to their conception at

* *Op. citat.*, lect. liii.

† *Des Maladies Mentales*, tom. i., p. 417.

the time. *Melancholy* is a state of mind which even the gayest must feel for some time after any calamity. Without knowing why they should be sorrowful, they still *are* sorrowful." * The same thought is expressed by one of the most recent German writers on psychology, in the following passage:—"There are cases in which almost nothing but this excitement (emotion) itself, a certain degree of *aise*, or *malaise*, at best a peculiar *nuance* of the physical or moral tone, makes its appearance in the consciousness, while a plain perception of the condition which thus becomes shared, or of the external impression which caused it, is totally wanting." †

However speculative to many persons may appear the mode in which this discussion is conducted, or the views advanced, the present doctrine aids in the formation of clearer concep-

* *Op. citat.*, lect. lii.

† "Es gibt Falle, in denen fast nur diese Erregung selbst, ein bestimmter Grad des Wohl oder Wehe, höchstens eine eigenthümliche Färbung des körperlichen oder geistigen Stimmung in Bewusstseyn auftritt, während eine deutliche Wahrnehmung des Zustandes, aus dem dieser Antheil genommen wird, oder des äussern Eindruckes, der ihn hervorbrachte, gänzlich fehlt."—*Medicinische Psychologie oder Physiologie der Seele*. Von Dr. Rudolph Hermann Lotze, Professor in Göttingen. p. 233.

tions regarding many pathological as well as physiological phenomena. When we look upon the great ganglionic masses placed at the base of the cerebral hemispheres as an intermediate sensorium between purely ideal states on the one side, and sensational impressions on the other, it becomes intelligible that disordered bodily health should in many instances, by the laws of nervous conduction, painfully impress the emotional sensibility—pervert the cænæsthesis; and that the influence, ascending still further, should act upon the development of thought, giving rise to anxious and distressing ideas. The agency of visceral mischief in the production of insanity—a well ascertained fact—thus becomes clearer to the apprehension. We may trace the process in reverse order:—painful intelligence, or voluntary brooding over the ordinary vexations of life, exercising itself through the hemispherical ganglia, exerts a downward action upon the emotional centres; anxiety, sorrow, settled melancholy, ensue; the influence still descending, along the course of the sympathetic system we may suppose, disorder of the circulation and of the thoracic and abdominal viscera totally deranging the health, may follow as the consequence.

Certain feelings affect the purely organic func-

tions in methods suggesting various but special relations between particular structures and the encephalic centres of emotion,—a circumstance corresponding with the idea that these latter may be aggregates of smaller ganglia, having proper functions according to some natural divisibility in the several forms of cænæsthetic sensibility. Such an hypothesis would not be unreasonable ; its development, in accordance with my own physiological views, would demand an allocation to distinct portions of the corpora striata and optic thalami of feelings correspondent with forms of thought instrumentally evolved by those portions of the hemispherical ganglia with which the former structures were particularly in fibrous communication.* “ Fear,” says Dr. Urichton,

* The fibrous communication of the Corpora Striata being chiefly with the Motor tract of the Medulla Oblongata, it is probable, on the theory which I have submitted, that the function of these bodies may have some special relation to voluntary motion, which—originating in an intellectual operation—has yet, as we have seen, some emotion of the compound order for its *immediate* antecedent. The principal communication of the Thalami being with the Sensory tract, it is in like manner probable that these ganglionic structures may be more particularly concerned with emotion as it exhibits itself in purely cænæsthetic phenomena.

“is apt to occasion a diarrhœa and incontinence of urine; anger affects the functions of the liver; grief disorders the stomach and affects the lacrymal gland; sudden terror, when without hope, produces an almost complete palsy; and hope itself, when the attainment of the object is near, affects the organs of respiration, and causes a quick and powerful distribution of blood throughout the body.”*

It is likely in the highest degree that, however the general functions of the hemispherical ganglia may have relation to the intelligence, there may be some divisibility of the parts, according to differences in forms of thought or particular processes of intellect; just as the probability has been suggested that the ganglionic masses supposed to have for their general function the manifestation of emotional sensibility, may have corresponding divisions. But, upon this subject, nothing would as yet appear to be actually proved.

It might seem, at first sight, that some incompatibility existed between well-observed cranioscopic facts, and the doctrine which teaches that

* *Op. citat.*, vol. ii., pp. 137, 138.

the region of thought is in the hemispheres at large, rather than in the anterior division exclusively; for, indeed, to those who have never had faith in phrenological details, a peculiar connexion of the forehead with the intellect has always been deemed more than probable. Yet if we examine this matter a little more carefully, we shall see that, to whatever extent it may be thought necessary, from the state of facts, to admit some classification of mental faculties in correspondence with divisions of the cerebral hemispheres, there is nothing in any such proceeding at all irreconcilable with my own speculations.

I would here premise that it is by no means an established truth, that the mind is susceptible of any such analysis of its modes of being and doing, as systematic psychologists would imply. Undoubtedly, particular mental states arise which may be rightly enough designated Veneration, Self-esteem, Love of Glory, Desire of Knowledge, and so on; but, then, such distinctions and resultant classifications may be made without limit; and each individual psychologist may set forth his own system with sufficiently plausible recommendations. We may distinguish and classify

sounds, odours, savours, and other forms of outward sense; but if the result were submitted as conclusive and final, its fallacy would soon be demonstrated. External sensation, after the attainment of its five grand divisions, may be regarded as having an infinite variety in subdivision, corresponding with the infinitude of the influences which provoke it. Is not the same thing true of all our sensibilities and aptitudes?

Whatever general division and arrangement of our mental faculties, as active principles, we may institute, or believe to be fundamental, do we not, dealing with particular faculties and in the last analysis, come to the combined and reciprocal agency of an Idea and an Emotion? And are not all our tendencies and powers, as sources of action and conduct, resolvable into Thought and Feeling? Is there not established, so to speak, a *solidarity* between certain Classes of Ideas and particular Forms of Emotional Sensibility? And is it not in this way that we see developed what we call the Passions, the Affections, and the Sentiments?

It is true that we may fix attention upon some of the more prominent states of the mind for purposes of exposition, elucidation, and illustration;

I incline myself, however, to the opinion that all attempts to reduce and limit them to a given number of definite categories will be seen constantly to fail when the results become subjected to strict and close examination. "Our emotions," says Brown, "exist in *innumerable* forms, as diversified by slight changes of circumstances."* And, in another place, the same philosophical writer observes, "If we had not invented any terms whatever, we should have seen, as it were, a *series of emotions* all shadowing into each other, with differences of tint more or less strong, and *rapidly distinguishable*."† And certainly the causes operating to produce diversity in the forms of our emotional sensibility, are, in most cases, differences rather in the excitant thought than in particular classifiable tendencies. We *admire* the useful and *revere* the virtuous, and thus variety of feeling is developed according to the idea which provokes it in the individual case; and yet we might speak of Regard for the Good as a fundamental faculty, and the phraseology would cover two such different modes of feeling as those just adduced. "Our consciousness," says Brown, "if we appeal to it, will tell us that to admire what is

* *Op. citat.*, lect. lxxii.

† *Ibid.*, lect. lvii.

useful, and to revere what is virtuous, are feelings as different as any two feelings which are not absolutely opposite."*

The same eminent writer has a passage which goes to show that even the Intelligence exercising its so-called *faculties*, has, in the determination of its outward activity, an emotional element mixed up with it; for, considered in itself, the intelligence is essentially immanent and intransitive. "To sit down to compose," says he, "is to have a general notion of some subject which we are about to treat, with the *desire of developing it*, and the *expectation*, or perhaps the *confidence* that we shall be able to develop it more or less fully. The desire, like every other vivid feeling, has a degree of permanence which our vivid feelings only possess, and, by its permanence, tends to keep the accompanying conception of the subject which is the object of the desire also permanent before us; and while it is thus permanent, the usual spontaneous suggestions take place; conception follows conception in rapid but relative series, and our judgment all the time approving and rejecting, according to those relations of

* *Op. citat.*, lect. lxxviii.

fitness and unfitness to the subject which it perceives in the parts of the train."*

When we take individual faculties, either those of the phrenologist or those analytically obtained by the pure psychologist, we shall find, I think, that any of them, separately, will admit of decomposition into elements ideal and emotional. As an illustration of this statement, I will select three phrenological faculties,—Eventuality as an *Intellectual Power*, Veneration as a *Moral Sentiment*, and Destructiveness as an *Animal Propensity*. It will thence be shown that the physiological psychology proposed in these pages is in no way at variance with some special allocation of the *Intellectual Faculties* in the anterior division of the cerebrum.

Now, Eventuality, according to phrenological teaching, exercises itself with changing phenomena—events; it procures information, and reproduces it in memory. This, then, may be deemed its *ideal* function—thought; accomplished, according to phrenology, through the organic instrumentality of vesicular neurine investing the cerebral convolutions placed behind a certain

* *Op. citat.*, lect. xlii.

portion of the frontal bone. But, pending this exercise, there is *curiosity*, gratified, excited, or provoking to action, as the case may be; and curiosity, in all its modifications and reactions, is an *emotional* state—feeling; and this feeling, we might assume, taking phrenological ground, to be correlated with a physiological change in that part of the supposed emotive ganglia in direct fibrous communication with the vesicular neurine before mentioned.

As regards Veneration, there are persons of a reverent and devout tendency, who show it rather in the direction of their spontaneous and instinctive *thinking*, as it were, than in any great amount of devotional *sensibility*. The ideas of some individuals are always upon antiquity, upon great men, and more especially upon the religious objects of reverence; and that, too, in cases wherein there is but little manifestation of feeling. Here we have the ideal, the thought-characterising display of veneration. In other instances, we see the excesses of devotional feeling, without much thought in regard to its objects. In going to the anatomy, we see that vesicular neurine is at the central summit of the cerebral convolutions—regarded by phrenologists

As the organ of veneration—and that this has its root, so to speak, in similar tissue beneath the hemispheres.

Destructiveness supplies a not less obvious illustration of my meaning. There is cruelty, manifesting itself chiefly in the course of *thought*, and there is wrath, as a highly-excited *feeling*. When deliberate acts of poisoning and of incendiarism are perpetrated, when defenceless and helpless creatures are gratuitously tortured, destructiveness is mainly *ideal*—it is cold-blooded. When rage and fury show themselves—when, in this way, there is vivid perturbation of the *cænæsthesis*—in deeds of violence, there is destructive *emotion*. The anatomy would suggest, on phrenological grounds, the same explanation of this difference as in the previous illustrations.

But phrenologists commonly assume that, apart from the intellect, all the faculties resolve themselves into *kinds of feeling*, passive in complacency and dissatisfaction, and active in impulse; the share which ideas have in their actual manifestation being attributable to co-operation of the intelligence. This, however, was not the teaching of Gall.

I have already noted in the preceding pages, that ordinary thinking very often goes on quite

automatically, yet intelligently, and independently of the will; that, from the recesses of the mind, there is a spontaneous course of coherent thought; habitually evolving itself; and that this course of thought is quite distinguishable from that which obtains in direct, active, and voluntary exercise of the intellect proper, with which the anterior lobes of the cerebrum may have some special connexion. This mental spontaneity, so to call it, constitutes a perpetual spring of the most varied ideas, a constant source of psychical imagery, and thence, as before stated, denominated the imagination; and this property of the mind may present results to the consciousness without any sensible and active emotion. "That there is imagination," says Brown, "or new combinations of images and feelings, *unaccompanied with any desire*, is as true as that there is memory without intentional reminiscence."*

Now Gall himself recognised and appreciated this general attribute of the mind, as appertaining to each of the phrenological faculties, and as giving to them separately a mode of intelligence. He says, "I call imagination the action of every

* *Op. citat.*, lect. xlii.

faculty whatever that has place independently of the external world. The imagination of the sense of places creates landscapes. The imagination of the sense of tones creates music. The imagination of the sense of numbers creates problems. This explains how the same man may have a prompt and sure judgment relative to some subjects, and be almost imbecile in regard to others ; how he may have a most lively and fertile imagination for certain matters, and be frozen and sterile for others.”*

Dr. Carpenter has recently enunciated a doctrine of the emotions substantially similar in its psychology to that which has been propounded in the present chapter ; having adopted my own view, which recognises other forms of emotional sensibility than those of mere pleasure and pain, but having precedence not only of myself but of every other writer, I believe, in decomposing the emotions, on physiological grounds, into elements of thought and feeling, and in pointing out the joint instrumentality of the hemispheric and of the sensorial ganglia in their production.†

* *Sur les Fonctions du Cerveau*, tom. vi., p. 402.

† *Human Physiology*, fifth edition, in which the whole subject is discussed at great length, and in most instructive detail.

CHAPTER IX.

THE WILL.

WHAT explanation or definition can be given of the Will—that attribute of human nature which supplies the basis of moral responsibility, and the destruction or weakening of which constitutes so important a feature in mental pathology? Certainly, the will regarded as a power, stands apart from all other faculties, and as a psychical activity represents a capability altogether proper to itself. It is so entirely peculiar that, swaying and dominating over mental conditions of every kind, we cannot conceive it to be mixed up specially with any particular ganglionic mass. “An act of the will,” says Morell, “embodies the effort of the whole man, implying at the same time intelligence, feeling, and force; physiologically speaking, this state of mind will stand in correlation with the total affection of the nervous system. We regard it as an expression of the totality of our organic power, the whole governing

the parts, and directing to the fulfilment of one purpose.”*

The will, indeed, forms in the most striking and especial manner the active and reactive faculty of the conscious self, moving the organism and moved by it; it initiates functional exercise, and controls and modifies it when otherwise provoked. Upon it rests the power to regulate and determine human *conduct*; since the will is that faculty by which, the occasion given and all things necessary for action, we can act or not act, can choose to do this thing or to do its opposite. To a true voluntary action, certain conditions are needful; there must be two or more terms upon which the choice can fall, and which, therefore, constitute the *objects* of choice; these terms must be accurately present to the mind, so that a judgment may be formed concerning them; there must, further, be the opportunity for action, so that *choice* may be exercised. Strictly speaking, it cannot be said, as maintained by the advocates of what is called philosophical necessity, that the free acts of the will have any absolutely determining cause, organic or moral; they have in-

* *Op. citat.*, pp. 101, 102.

ducement, they have motives in thought and feeling, but such inducements and motives, in their action upon the Me-ity, do not in any way interfere with a true moral liberty.

Unquestionably, the origination and succession of psychical states are not altogether under control of the will. As before stated, ideas and emotions have some sort of automatic spring; but when present they are more or less governable by voluntary effort; and, in healthy states of the mind, acts and moral conduct—thought and feeling receiving outward expression—always result immediately from determinations of the will; numerous and varied forms of consciousness, under such circumstances, being ever present as inducements to action, from among which the choice may be made. Dr. Carpenter, discussing the office of this autocrat among the mental faculties, observes, “It may be stated, as a fundamental axiom, that the will can *originate* nothing; its power being limited to the *selection* and *intensification* of what is actually before the consciousness.”*

The exact relation subsisting between the Me-

* *Op. citat.*, p. 590.

ity, and the various thoughts and feelings which present themselves to it, as influences leading to an exercise of the will, is familiarly put by Reid, in his work on the *Intellectual Powers*. "We seem," says he, "to treat the thoughts that present themselves in crowds, as a great man treats those that attend his levee. They are all ambitious of his attention. He goes round the circle bestowing a bow upon one, a smile upon another; asks a short question of a third, while a fourth is honoured with a particular conference, and the greater part have no particular mark of attention, but go as they came. It is true, he can give no mark of his attention to those who are *not there*; but he has a sufficient number for making a choice and distinction."*

May we not, finally, regard the will, in itself and in its consequences, as distinguishing man to an incalculable extent from the lower animals? Is it not by agency of the will that our consciousness becomes its own object? Is it not by the same power that we analyse, and exercise control over our mental states, that we rise to abstractions and general notions, realize the thought of

* Essay iv., chapter 4.

causality, discriminate between virtue and vice, grasp some idea, however obscure, of the Infinite? Is it not thus that we are made capable of believing in a future state, in the immortality of the soul, in the existence of a Supreme Being, and made susceptible, at the same time, of the hopes and the aspirations which these elevated conceptions inspire?

But I must not pursue so lofty a theme. It is as much above as beyond the domain of purely scientific discussion; and it certainly is foreign to the purpose of the present publication.

CHAPTER X.

CONCLUSION.

IN propounding the foregoing psychological doctrines, I have striven to correlate them with our best established teachings concerning the brain and nervous system; and, where *knowledge* upon the subject is defective, with some probable hypothesis and rational speculation. It would be too much to say that the physiological psychology is complete, and to be relied upon in all its parts, or that it is competent to explain all the difficult questions which arise in connexion with this interesting topic. I think, however, that, as a whole, it is recommended to us by the highest probability. It rests upon a wide induction of facts; and, where its propositions are not demonstrable, they have, I think, verisimilitude. Whatever alterations in detail may hereafter become necessary, as the result of ulterior investigation, there can be but little doubt, I apprehend, that, in its essential substance and form, it will main-

tain for itself that firm position which, in this country at least, it has already established.

Certainly, in much that has been advanced, there is an insufficiency of evidence for proof of some of the proposed views; and, upon several points, the attempted generalization may be premature. But if, in our investigations—particularly of such entangled questions as the present—we go on for ever accumulating facts merely, and never make an effort to determine the conclusion which they would seem to indicate, we shall only render the existing perplexity still more complicated. As well observed by an able and eminent philosopher of the present day:—"Although we may often err on the side of hasty generalization, we may equally err on the side of mere elaborate collection of observations, which, though sometimes leading to a valuable result, yet, when cumulated without a connecting link, frequently occasion a costly waste of time, and leave the subject to which they refer in greater obscurity than that in which it was involved at their commencement." *

I submit, indeed, that in any attempted corre-

* *The Correlation of Physical Forces.* By W. R. Grove. Third edition. p. 214.

lation of psychology and physiology, it is impossible, in the present state of positive knowledge, to avoid speculation; and, further, that for the attainment of clear and connected ideas of psychological pathology and medicine, it is good and useful to construct rational hypotheses, in default of complete and absolutely reliable theories. But, of course, hypotheses must not have their value or their office misunderstood; they cannot rightly form a rest, like an admitted axiom; they must always be held ready for modification or abandonment, when evidence appears to demand some such proceeding. Meanwhile, they serve to "colligate facts," and to fix the attention more inquiringly and searchingly upon phenomena that present themselves to observation or experiment. "There is a period in knowledge," says Dr. Crichton, "when hypothesis must be indulged in, if we mean to make any progress. It is that period when the facts are too numerous to be recollected without general principles, and yet where the facts are too few to constitute a valid theory."*

Before closing this little work, I would once

* *Op. citat.* Preface, p. xii.

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